Welcome to DialogClassic Web(tm)

Dialog level 02.17.00D
Last logoff: 22jul03 20:01:31
Logon file405 23jul03 17:23:36

*** ANNOUNCEMENT ***

***

--File 654 - US published applications from March 15, 2001 to the present are now online. Please see HELP NEWS 654 for details.

***

--File 581 - The 2003 annual reload of Population Demographics is complete. Please see Help News581 for details.

***

--File 156 - The 2003 annual reload of ToxFile is complete. Please see HELP NEWS156 for details.

***

--File 990 - NewsRoom now contains February 2003 to current records. File 992 - NewsRoom 2003 archive has been newly created and contains records from January 2003. The oldest months's records roll out of File 990 and into File 992 on the first weekend of each month. To search all 2003 records BEGIN 990, 992, or B NEWS2003, a new OneSearch category.

***

--Connect Time joins DialUnits as pricing options on Dialog. See HELP CONNECT for in

***

***

--SourceOne patents are now delivered to your email inbox as PDF replacing TIFF delivery. See HELP SOURCE1 for more information.

***

--Important news for public and academic libraries. See HELP LIBRARY for more information.

***

--Important Notice to Freelance Authors--
See HELP FREELANCE for more information

***

NEW FILES RELEASED
***World News Connection (File 985)
***Dialog NewsRoom - 2003 Archive (File 992)
***TRADEMARKSCAN-Czech Republic (File 680)
***TRADEMARKSCAN-Hungary (File 681)
***TRADEMARKSCAN-Poland (File 682)

***

UPDATING RESUMED

***

RELOADED
***Population Demographics -(File 581)
***CLAIMS Citation (Files 220-222)

REMOVED

***

>>> Enter BEGIN HOMEBASE for Dialog Announcements <<<
>>> of new databases, price changes, etc. <<<

****

HILIGHT set on as ' '
>>>100 is not in the range between 1 and 50, original value 30 is used.
IGOR705 is set ON as an alias for 2,9,15,16,20,35,65,77,99,148,160,233,256,275,347,3

10,813.
IGORMEDIC is set ON as an alias for 5,34,42,43,73,74,129,130,149,155,442,444,455.
IGORINSUR is set ON as an alias for 169,625,637.
IGORBANK is set ON as an alias for 139,267,268,625,626.
IGORTRANS is set ON as an alias for 6,63,80,108,637.
IGORSHOPCOUPON is set ON as an alias for 47,570,635,PAPERSMJ,PAPERSEU.
IGORINVEN is set ON as an alias for 6,7,8,14,34,94,434.
IGORFUNDTRANS is set ON as an alias for 608.
*** * * * See HELP NEWS 225 for information on new search prefixes**
and display codes

*** ***

SYSTEM:HOME
Cost is in DialUnits
*** DIALOG HOMEBASE(SM) Main Menu ***

Information:
1. Announcements (new files, reloads, etc.)
2. Database, Rates, & Command Descriptions
3. Help in Choosing Databases for Your Topic
4. Customer Services (telephone assistance, training, seminars, etc.)
5. Product Descriptions

Connections:
6. DIALOG(R) Document Delivery
7. Data Star(R)

/H = Help /L = Logoff /NOMENU = Command Mode

Enter an option number to view information or to connect to an online
service. Enter a BEGIN command plus a file number to search a database
(e.g., B1 for ERIC).
?

B IGOR705
>>> 77 does not exist
>>>1 of the specified files is not available
23jul03 17:24:12 User268082 Session D30.1
$0.00 0.237 DialUnits FileHomeBase
$0.00 Estimated cost FileHomeBase
$0.14 INTERNET
$0.14 Estimated cost this search
$0.14 Estimated total session cost 0.237 DialUnits

SYSTEM:OS - DIALOG OneSearch
File 2:INSPEC 1969-2003/Jul W2
(c) 2003 Institution of Electrical Engineers
***File 2: Alert feature enhanced for multiple files, duplicates**
removal, customized scheduling. See HELP ALERT.
File 9:Business & Industry(R) Jul/1994-2003/Jul 22
(c) 2003 Resp. DB Svcs.
File 15:ABI/Inform(R) 1971-2003/Jul 22
(c) 2003 ProQuest Info&Learning
***File 15: Alert feature enhanced for multiple files, duplicate**
removal, customized scheduling. See HELP ALERT.
File 16:Gale Group PROMT(R) 1990-2003/Jul 23

(c) 2003 The Gale Group
***File 16: Alert feature enhanced for multiple files, duplicate**
removal, customized scheduling. See HELP ALERT.
File 20:Dialog Global Reporter 1997-2003/Jul 23
(c) 2003 The Dialog Corp.
File 35:Dissertation Abs Online 1861-2003/Jun
(c) 2003 ProQuest Info&Learning
File 65:Inside Conferences 1993-2003/Jul W3
(c) 2003 BLDSC all rts. reserv.
File 99:Wilson Appl. Sci & Tech Abs 1983-2003/Jun
(c) 2003 The HW Wilson Co.
File 148:Gale Group Trade & Industry DB 1976-2003/Jul 23
(c)2003 The Gale Group
***File 148: Alert feature enhanced for multiple files, duplicate**
removal, customized scheduling. See HELP ALERT.
File 160:Gale Group PROMT(R) 1972-1989
(c) 1999 The Gale Group
File 233:Internet & Personal Comp. Abs. 1981-2003/May
(c) 2003 Info. Today Inc.
File 256:SoftBase:Reviews,Companies&Prods. 82-2003/Jun
(c)2003 Info.Sources Inc
File 275:Gale Group Computer DB(TM) 1983-2003/Jul 23
(c) 2003 The Gale Group
File 347:JAPIO Oct 1976-2003/Mar(Updated 030703)
(c) 2003 JPO & JAPIO
***File 347: JAPIO data problems with year 2000 records are now fixed.**
Alerts have been run. See HELP NEWS 347 for details.
File 348:EUROPEAN PATENTS 1978-2003/Jul W02
(c) 2003 European Patent Office
File 349:PCT FULLTEXT 1979-2002/UB=20030717,UT=20030710
(c) 2003 WIPO/Univentio
File 474:New York Times Abs 1969-2003/Jul 21
(c) 2003 The New York Times
File 475:Wall Street Journal Abs 1973-2003/Jul 22
(c) 2003 The New York Times
File 476:Financial Times Fulltext 1982-2003/Jul 23
(c) 2003 Financial Times Ltd
File 583:Gale Group Globalbase(TM) 1986-2002/Dec 13
(c) 2002 The Gale Group
***File 583: This file is no longer updating as of 12-13-2002.**
File 610:Business Wire 1999-2003/Jul 23
(c) 2003 Business Wire.
***File 610: File 610 now contains data from 3/99 forward.**
Archive data (1986-2/99) is available in File 810.
File 613:PR Newswire 1999-2003/Jul 23
(c) 2003 PR Newswire Association Inc
***File 613: File 613 now contains data from 5/99 forward.**
Archive data (1987-4/99) is available in File 813.
File 621:Gale Group New Prod.Annou.(R) 1985-2003/Jul 23
(c) 2003 The Gale Group
File 624:McGraw-Hill Publications 1985-2003/Jul 23
(c) 2003 McGraw-Hill Co. Inc
***File 624: Homeland Security & Defense and 9 Platt energy journals added**
Please see HELP NEWS624 for more
File 634:San Jose Mercury Jun 1985-2003/Jul 22
(c) 2003 San Jose Mercury News
File 636:Gale Group Newsletter DB(TM) 1987-2003/Jul 23
(c) 2003 The Gale Group
File 810:Business Wire 1986-1999/Feb 28
(c) 1999 Business Wire

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  File 813:PR Newswire  1987-1999/Apr 30
         (c) 1999 PR Newswire Association Inc

      Set  Items  Description
      ---  -----  -----------
?

S (GENERATOR? (20N) INSTALL???) AND ((REMOTE OR DIFFICULT) (20N) (LOCATION? OR PLACE
Processing
Processed  10 of  28 files ...

S (GENERATOR? (20N) INSTALL???) AND ((REMOTE OR DIFFICULT) (20N) (LOCATION? OR PLACE
Processing
Processed  10 of  28 files ...
Processing
Processed  20 of  28 files ...
Completed processing all files
          768321  GENERATOR?
         2844290  INSTALL???
           18918  GENERATOR?(20N)INSTALL???
         1401433  REMOTE
         3288904  DIFFICULT
         3440535  LOCATION?
        10112082  PLACE?
          268086  (REMOTE OR DIFFICULT)(20N)(LOCATION? OR PLACE?)
              85  UTILILTY
      S1       0  (GENERATOR? (20N) INSTALL???) AND ((REMOTE OR DIFFICULT)
                  (20N) (LOCATION? OR PLACE?)) AND UTILILTY
?

S (GENERATOR? (20N) INSTALL???) AND ((REMOTE OR DIFFICULT) (20N) (LOCATION? OR PLACE
Processing
Processed  10 of  28 files ...
Processing
Processed  20 of  28 files ...
Completed processing all files
          768321  GENERATOR?
         2844290  INSTALL???
           18918  GENERATOR?(20N)INSTALL???
         1401433  REMOTE
         3288904  DIFFICULT
         3440535  LOCATION?
        10112082  PLACE?
          268086  (REMOTE OR DIFFICULT)(20N)(LOCATION? OR PLACE?)
      S2     454  (GENERATOR? (20N) INSTALL???) AND ((REMOTE OR DIFFICULT)
                  (20N) (LOCATION? OR PLACE?))
?

B IGOR705
>>>          77 does not exist
>>>1 of the specified files is not available
       23jul03 17:36:16 User268082 Session D30.2
             $1.47    0.206 DialUnits File2
     $1.47  Estimated cost File2
             $0.99    0.182 DialUnits File9
     $0.99  Estimated cost File9
             $1.54    0.286 DialUnits File15
     $1.54  Estimated cost File15
             $2.83    0.524 DialUnits File16
     $2.83  Estimated cost File16
```

```
          $0.97    0.973 DialUnits File20
     $0.97  Estimated cost File20
          $0.35    0.085 DialUnits File35
     $0.35  Estimated cost File35
          $0.19    0.050 DialUnits File65
     $0.19  Estimated cost File65
          $0.12    0.051 DialUnits File99
     $0.12  Estimated cost File99
          $3.09    0.572 DialUnits File148
     $3.09  Estimated cost File148
          $0.39    0.072 DialUnits File160
     $0.39  Estimated cost File160
          $0.09    0.033 DialUnits File233
     $0.09  Estimated cost File233
          $0.16    0.030 DialUnits File256
     $0.16  Estimated cost File256
          $0.60    0.111 DialUnits File275
     $0.60  Estimated cost File275
          $1.48    0.135 DialUnits File347
     $1.48  Estimated cost File347
          $2.01    0.443 DialUnits File348
     $2.01  Estimated cost File348
          $2.14    0.451 DialUnits File349
     $2.14  Estimated cost File349
          $0.17    0.049 DialUnits File474
     $0.17  Estimated cost File474
          $0.12    0.034 DialUnits File475
     $0.12  Estimated cost File475
          $0.09    0.086 DialUnits File476
     $0.09  Estimated cost File476
          $0.18    0.052 DialUnits File583
     $0.18  Estimated cost File583
          $0.08    0.083 DialUnits File610
     $0.08  Estimated cost File610
          $0.08    0.075 DialUnits File613
     $0.08  Estimated cost File613
          $0.76    0.140 DialUnits File621
     $0.76  Estimated cost File621
          $0.41    0.072 DialUnits File624
     $0.41  Estimated cost File624
          $0.06    0.062 DialUnits File634
     $0.06  Estimated cost File634
          $0.78    0.145 DialUnits File636
     $0.78  Estimated cost File636
          $0.09    0.090 DialUnits File810
     $0.09  Estimated cost File810
          $0.08    0.082 DialUnits File813
     $0.08  Estimated cost File813
          OneSearch, 28 files,  5.173 DialUnits FileOS
     $3.02  INTERNET
    $24.34  Estimated cost this search
    $24.48  Estimated total session cost   5.411 DialUnits

SYSTEM:OS  - DIALOG OneSearch
  File   2:INSPEC  1969-2003/Jul W2
         (c) 2003 Institution of Electrical Engineers
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```
        (c) 2003 San Jose Mercury News
  File 636:Gale Group Newsletter DB(TM)  1987-2003/Jul 23
        (c) 2003 The Gale Group
  File 810:Business Wire  1986-1999/Feb 28
        (c) 1999 Business Wire
  File 813:PR Newswire  1987-1999/Apr 30
        (c) 1999 PR Newswire Association Inc

      Set  Items  Description
      ---  -----  -----------
?

S (GENERATOR? (20N) INSTALL???) AND ((REMOTE OR DIFFICULT) (20N) (LOCATION? OR PLACE
Processing
Processed  10 of  28 files ...
Processing
Processed  20 of  28 files ...
Processing
Completed processing all files
         768321  GENERATOR?
        2844292  INSTALL???
          18918  GENERATOR?(20N)INSTALL???
        1401434  REMOTE
        3288907  DIFFICULT
        3440538  LOCATION?
       10112086  PLACE?
         268086  (REMOTE OR DIFFICULT)(20N)(LOCATION? OR PLACE?)
      S1    454  (GENERATOR? (20N) INSTALL???) AND ((REMOTE OR DIFFICULT)
                 (20N) (LOCATION? OR PLACE?))
?

S S1 AND ((ELECTRICAL OR POWER ) (3N) GENERATOR?)
Processed  10 of  28 files ...
Processing
Completed processing all files
            454  S1
        1905988  ELECTRICAL
        7780801  POWER
         768321  GENERATOR?
          94329  (ELECTRICAL OR POWER)(3N)GENERATOR?
      S2    169  S1 AND ((ELECTRICAL OR POWER ) (3N) GENERATOR?)
?

S S2 AND (SERVICE (2N) COMPANY)  AND (MAINTENANCE OR MAINTAINING OR MAINTAIN)
Processing
Processing
Processing
Processed  10 of  28 files ...
Processing
Processed  20 of  28 files ...
Processing
Completed processing all files
            169  S2
       13909365  SERVICE
       32030822  COMPANY
         592351  SERVICE(2N)COMPANY
        1942445  MAINTENANCE
        1245928  MAINTAINING
        2405570  MAINTAIN
      S3      8  S2 AND (SERVICE (2N) COMPANY)  AND (MAINTENANCE OR
```

MAINTAINING OR MAINTAIN)

?

T S3/TI, KWIC/1-8

3/TI,KWIC/1 (Item 1 from file: 15)
DIALOG(R)File 15:(c) 2003 ProQuest Info&Learning. All rts. reserv.

Turn emergency generators into dollars

...TEXT: and connects the generator to the downsized load. When the grid can again supply full**power** , the standby□generator□is disconnected and the full load is reconnected to the grid.

Because the power seldom...

... of high power usage the grid may not be able to supply sufficient power to **maintain** the desired load. In this situation, power generated at a customer's site reduces the...

... demand. To ensure this, the energy management service provider takes over complete responsibility for the**maintenance**of the equipment at each **location** . Regular □maintenance□ visits, coupled with continuous monitoring and testing from the**remote**dispatch center, combine to assure reliability of the equipment.

In practice, a system is set...

...for this specialized extra capacity in proportion to the total capacity. The energy manager designs,**installs**and operates the special equipment needed to connect the **generators** to the grid, and the additional equipment needed to remotely control and monitor each**generator**and its **power** production.

Figure 2 shows how both the electrical and the money paths are linked in...

... offer that's difficult to refuse. The factory further benefits from the reduced cost of**maintaining**its standby equipment. Moreover, at such time as the standby generator does turn on, the...

... The availability of wholesale wheeling suggests that there will always be cheaper power available than**power**produced from standby□generators□ in factories. But it is important to remember that the grid is subject to transmission... value of having an extra kW capacity likewise exceeds $100/yr. If the energy management**service company**charges the utility only half that, it is a good deal for the utility.

Next...

... of roughly three years, or an internal rate of return (IRR) of 27 percent. When **maintenance** costs are included (perhaps $2/kW annually), the effective payment to the generator owner rises...

...logged.

The next step was to test the controller system with a large (300 kW) **generator** . Cummins Northwest in Renton, Wash., has□installed□Onan parallel switching equipment designed to seamlessly connect the 300 kW **generator** to its internal load. This means the□generator□will be synchronized to the grid and then connected. Equipment is**installed**to

guard against ground faults and other potential failure modes, such as unintentionally providing power to the grid. Typically, the**generator** will be powered up to carry the entire load from the grid before disconnecting. Power-quality monitoring equipment was**installed**to verify that the system was not perturbing either the load or the grid. This...

3/TI,KWIC/2 (Item 2 from file: 15)
DIALOG(R)File 15:(c) 2003 ProQuest Info&Learning. All rts. reserv.

Wireless '93: CTIA show coverage CTIA exhibitor update Schedule-at-a-glance Find-a-product

...TEXT: on Reply Card

ALEXANDER BATTERIES BOOTH 2044

COMPANY PROFILE

Alexander manufactures replacement batteries and battery **maintenance** equipment for cellular phones, laptop computers, 2-way, bio-medical and professional video industries.

ESTABLISHED... magazine for professionals in wireless communications in Latin America. Circle (318) on Reply Card

CELLULAR **SERVICE** BOOTH 1936

COMPANY PROFILE

Cellular **Service** offers billing and information management services and equipment and paging management systems to the cellular...

...tower installers.

ESTABLISHED PRODUCTS

The company provides various products for companies that own and/or **maintain** tower systems: antennas, hardware, mounts, replacement radome covers and installation hardware.

NEW PRODUCTS

CESCO will...credit decision system.

NEW PRODUCTS

The company will introduce ProFile, a series of databases that**maintain** information on individuals and business entities who have created significant write-offs or shut-offs... communications buildings and shelters, mobile communications systems, COWs, fiber-optic splicing trailers, standby power services,**power**restoration trailers,□generators□ , **generator** buildings and custom loadbanks.
NEW PRODUCTS

FWT will introduce its mobile communications system. Circle (358...

... or custom-manufactured portable communication shelters; premiere mobile system (cell on wheels) with tower and **generator installed** ; and professional radio equipment installation. Circle (360) on Reply Card

FILTRONIC COMTEK LTD. BOOTH 2950...telephone. Circle (386) on Reply Card

INTERVOICE BOOTH 3032

COMPANY PROFILE

InterVoice is a full-**service**voice automation□company□that develops and markets systems for voice response, outbound dialing, call directing and audiotex.

ESTABLISHED...

...NEW PRODUCTS
The Sierra 513A is designed for qualifying cable, system turn-up and span **maintenance** testing of copper T1 digital transport systems, including high-capacity digital service, digital loop carrier...

...Card

KOHLER/WPI BOOTH 2225

COMPANY PROFILE

The company specializes in sales and service of**power generators** , automatic transfer switches and switchgear.

ESTABLISHED PRODUCTS

The company offers Kohler Power Systems.

NEW PRODUCTS... the United States, but also a full scope of microwave services(survey, design, installation, monitoring, **maintenance** and service) to clients of all sizes.

NEW PRODUCTS
Locate recently acquired Metromedia Paging Services...

...dividers and the Call-Thru test set. Circle (398) on Reply Card

LORAL QUALCOMM SATELLITE **SERVICE** BOOTH 2531

COMPANY PROFILE

Loral Qualcomm, a joint venture between Loral and Qualcomm, will join limited partners to...

...Reply Card

MICROFLECT BOOTH 1941

COMPANY PROFILE

Microflect, established in 1956, provides turnkey installation and **maintenance** of communication systems.

ESTABLISHED PRODUCTS
The company offers towers, antenna support structures, waveguide support systems...

... return loss measurement of transmission lines and antenna systems, site investigations, tower inspections and tower**maintenance** . Circle (404) on Reply Card

MICRO-QUIK SYSTEMS BOOTH 3009

COMPANY PROFILE

Micro-Quick offers... track and turnkey construction, site acquisition, dc power and grounding system design, equipment installation, system **maintenance** and design engineering services. Circle (429) on Reply Card

NOBLE ARNOLD & ASSOCIATES BOOTH 3046

COMPANY... system. TS200 switch interface software and data acquisition network software provides switch monitoring, real-time**maintenance**of subscriber information and real-time collection of billing data. Circle (442) on Reply Card...
... QRV 1000 is a self-contained, vehicle-based cellular system, providing quick response communications from **remote locations** .

NEW PRODUCTS

Plexsys is introducing the D5000, which will have an increased capacity of up...

...Card

PROGRESS TELECOMMUNICATIONS BOOTH 1829

COMPANY PROFILE

Progress specializes in cellular system design, installation and **maintenance** and serves national and international operators.

ESTABLISHED SERVICES

The company offers project management, tower services, engineering, system installation and **maintenance**. Turnkey or individual services are also available. Circle (452) on Reply Card
PROGRESSIVE CONCEPTS BOOTH...leasing, registered professional engineering services, system design and consulting, FCC application filings, tower construction and **maintenance** services. Circle (471) on Reply Card

SHERMAN UTILITY STRUCTURES BOOTH 2803

COMPANY PROFILE

Sherman manufactures... and manufactures commercial and military communication buildings for cellular, satellite and microwave installations; and integrated**power**modules containing□generators□ , UPS equipment and switchgear. Circle (513) on Reply Card

THE RICHARD L. VEGA GROUP BOOTH...Ratelco Electronics (2740)

Tessco (1619)

Unitech Industries (2505)

VCP International (2707)

Yuasa-Exide (2719)
BATTERY **MAINTENANCE** EQUIP.

Advancetec Industries (1825)

AIexander Batteries (2044)

Cellular Wholesalers (D) (1431)

Communications Associates (D) (1944...

3/TI,KWIC/3 (Item 1 from file: 16)
DIALOG(R)File 16:(c) 2003 The Gale Group. All rts. reserv.

A Smart Standby

... But batteries only hold their charge so long. Many COs also have a stand-by**generator**set and accompanying□power□transfer switch.
The switch, and adaptation of microprocessor technology to it, is opening a new...

...utility's power fails, affecting a standby-power-equipped CO. A transfer switch, monitoring utility**power** , signals a□generator□to start up, providing backup power to keep telco batteries charged, supplying power for emergency lighting and**maintaining**the site's HVAC system. Power normally supplied by the utility is 'transferred,' or supplied...

...users can communicate through the phone lines to single or multiple transfer switches installed at**remote locations**across the globe. Up to 128 such switches can be connected to one telephone number...

...These states are especially vulnerable to severe thunderstorms and consequent power outages.
The company is**installing**Kohler microprocessor-controlled **generator**transfer switches at each site. The M340 switches represent one part of a multimillion-dollar investment to enhance UTM's phone**service** .
The phone**company** 's use of older generator transfer switches offered 60% reliability. While the switches were designed...

...moment one of the old transfer switches needed attention.
Microprocessor-based switches limit UTM's**service**calls. The **company**starts up, shuts down and monitors its CO back-up generators over a six-state...

...also lets the company get a jump on severe thunderstorms and go off-line to**generator power**at a telco site, avoiding problems before they occur.
UTM put its new transfer switches...

3/TI,KWIC/4 (Item 1 from file: 148)
DIALOG(R)File 148:(c)2003 The Gale Group. All rts. reserv.

Companies.(directory)(Directory)

... E-mail: act@gasturbinerepair.com; URI: www.gasturbinerepair.com
Services including metallurgical analysis, engineering design, **maintenance**consultation, specialty fixturing, vacuum heat treating,

inspection, NDE, QC/QA. Programs, certifications, life extension, reverse ...

...commercial/industrial boilers, boiler room equipment, pressure vessels, HVAC equipment, custom fabrication, hands-on operation/**maintenance**and troubleshooting training for boilers/HVAC.

AGET Manufacturing Co

1408 E Church St, PO Box...com

Manufactures leak detectors and detection systems, including sulphur hexafluoride detectors for switchgear assembly and**maintenance** .

Air Cure Inc

8501 Evergreen Blvd, Minneapolis, MN 55433; 763-717-0707, FAX: 763-717...

...and PCs installed at a low cost. Other services include RATA testing, service, repair, and**maintenance** .

Airflow Sciences Corp

37501 Schoolcraft Rd, Livonia, MI 48150; 734-464-8900, FAX: 734-464

...www.power.alstom.com

Supplies materials, engineering, technical and construction services and solutions for the**maintenance** , repair, rebuild, rehabilitation and modernization of existing power plants.

ALSTOM ESCA Corp

11120 NE 33rd...equipment, locomotives, information solutions and electromechanical infrastructure for power supply, track and stations. Also provides**maintenance**and renovation services for trains and railroads.

ALSTOM USA Inc

One AEG P1, Charleroi, PA...

...279-4296; E-mail: info@alturdyne.com; URL: www.alturdyne.com

Offers custom assembly of**power**equipment, including pumps, **generators**and compressors using diesel, gas or gas turbine engines to 5000-hp.

Aluma Systems

4810...

...mail: info@aluma.com; URL: www.aluma.com

Provides solutions in the fields of industrial**maintenance**and concrete construction using equipment for forming, shoring and scaffolding.

SALES OFFICES:

Aluma Systems Canada...

...821-0121, FAX: 781-821-0771; URL: www.99aetco.com

Provides electrical distribution switchgear testing,**maintenance** , and engineering services.

American Engineering Services Inc

5912 F Breckenridge Pkwy, Tampa, FL 33610; 813...

...248-426-4228; URL: www.isuzuengines.com

Supplies high-quality water-cooled diesels offering a**power**output from 25- to 325-hp.

American Metallizing Corp

90 Elinor Ave, Akron, OH 44305...com

Provides customer-specific special-hazard fire suppression/detection systems. Offers design, equipment, installation, commissioning, **maintenance**and retrofit services for gas turbine, BOP facilities and power plants.

Associated Research Inc

13860...

...6400, FAX: 757-233-7491; E-mail: taginfo@atlanticgrp.com; URL:

www.atlanticgrp.com
Provides**maintenance**integration,□maintenance□and modification and outage support services through specialized valve, condenser, turbine, QA/QC and staff...URL: www.load-bank.com
Provides resistive and reactive load banks for testing of standby **generators** , UPS systems, and batteries. Also features neutral grounding resistors for**generators**and transformers.
AW Sperry Instruments Inc
PO Box 9300, Smithtown, NY 11788; 631-231-7050...

...azco-inc.com; URL: www.azco-inc.com
Provides power plant construction services, including boiler **maintenance**and installation and centerline erection of gas turbines and generators.
B L Tec
30927 Schoolcraft...3616; E-mail: nuclear@bartlettinc.com; URL: www.bartlettinc.com
Provides staff augmentation services, including**maintenance** , janitorial, radiation safety and decontamination personnel. Also offers Excel scaffolding, remote monitoring systems and decontamination...in the areas of O and M cost projections, due diligence support, phased staffing support,**maintenance**management program implementation, craft support, O and M services, start-up and engineering services. (see...

...a range of services for boilers, heat exchangers, chimneys and cooling towers, Also offers construction,**maintenance** , repair, spare parts, refurbishment, failure analysis and installation.
Thermal Energy Services, Royersford, PA 610-948...mail: richardh@biach.com; URL: www.biach.com
Provides stud tensioning equipment with outage and**maintenance** support, training and documentation services.
Bibb and Assoc Inc
8455 Lenexa Dr, Lenexa, KS 66214...

...services, engineering design, total equipment procurement services, construction and construction management services, and support and **maintenance** .
Blasch Precision Ceramics
580 Broadway, Albany, NY 12204; 518-436-1263, FAX: 518-436-0098... www.brocoinc.com
Contact: Sales Mgr, Tom Joos
Provides cutting torch systems (for rescue and**maintenance**), nickel wearsurfacing, rods and powders, and portable MIG welders.
Brookfield Engineering Laboratories Inc
11 Commerce...

...axxent.ca; URL: www.expertwitness-electric.com
Offers electrical power systems engineers and specialists in **maintenance**and testing services and electrical forensic engineering for failure analysis, electrical equipment breakdowm and electricalmultipole **generators** , and□power□control and management systems.
Bryan Boilers
783 N Chili Ave, Peru, IN 46992; 765-473...and regenerative oxidizers for VOC fume air pollution control. Capabilities include turnkey installation, engineering service,**maintenance**service and heat recovery systems.
Catalytica Energy Systems Inc
430 Ferguson Dr, Mountain View, CA...

...electric and internal combustion-powered lift trucks. Dealers from more

than 450 locations provide support,**maintenance**and repair programs, fleet management services and operator training programs.

Cattron - Theimeg Inc

58 W...services ECAD diagnostic systems for electrical circuit monitoring programs for condition monitoring, predictive and corrective **maintenance** , and life extension.

COADE Inc

12777 Jones Rd, Suite 480, Houston, TX 77070; 281-890...leak detection services, Eddy current testing, condenser performance analysis amd tube plugging. Also provides mechanical**maintenance**and retubing services.

Condenser and Chiller Svs Inc

12340 East End Ave, Chino, CA 91710...Manufactures OEM filter bags and cloths in any woven or needle-felted fabric. Also offers**maintenance** and baghouse changeout services.

CSC Scientific Co Inc

2810 Old Lee Hwy, Fairfax, VA 22031...299-8395; E-mail: david.bronczyk@dayzim.com; URL: www.dznps.com

Provides services to**maintain** , modify and repair nuclear and fossil-fired power plants.

SALES OFFICES: Day & Zimmermann NPS, Lancaster...consulting firm serving the power industry with intelligent decision support systems for asset operations and**maintenance** .

* Del Mar Avionics

1621 Alton Pkwy, Irvine, CA 92606-4801; 949-250-3200, FAX: 949... dbongiorni@devcon.com; URL: www.devcon.com

Offers metal-filled epoxies and urethanes for tooling,**maintenance** and repair of parts and equipment as well as adhesives for production, bonding and**maintenance** .

DeZURIK/Copes-Vulcan

250 Riverside Ave N, Sartell, MN 56377-1743; 320-259-2000, FAX...

...to measure temperature, humidity, pressure, electrical input, data loggers, chart recorders and indicators. Instruments monitor**remote locations** , manufacturing processes and more.

DIEC

875 Sixth Ave, Suite 1701, New York, NY 10001; 212...0021; E-mail: awl@duromar.com; URL: www.duromar.com

Manufactures 100% solids, zero VOC,**maintenance**products and coatings for FGD systems, circulating water systems, chemical tanks, concrete linings and repair...FAX: 262-241-5248; E-mail: sales@eaglecmms.com; URL: www.eaglecmms.com

Develops computerized**maintenance**management software (CMMS) for work order management and preventive**maintenance**scheduling.

EAO Switch Corp

198 Pepe's Farm Rd, Milford, CT 06460; 203-877-4577...

...NO.sub.x), (SO.sub.2), HC and temperature). Suited for EPA compliance testing and**maintenance**applications. (See ad page 106)

Ederer Inc

2925 1st Ave 5, PO Box 24708, Seattle...

...92831; 800-398-4182; E-mail: jbarich@edisonoms.com; URL: www.edisonoms.com

Provides operations**maintenance** , engineering, and training services to the electrical generation, industrial, co-generation, and water/wastewater markets...8920; E-mail: eps@eps-inc.com; URL: wwweps-inc.com

Operates as a full-**service**environmental□company□ , offering waste disposal; UST; AST work; emergency spill response; spill site remediation;

asbestos, lead and...URL: www.everestvit.com
Provides remote visual inspection (RVI) equipment, sales, rentals and on-site**service** .
Everlasting VALVE**COMPANY** , INC.
Everlasting Valve Co
108 Somogyi Ct, S Plainfield, NJ 07080; 908-769-0700, FAX...com
Designs, manufactures and markets IR imaging systems used worldwide for thermal analysis in predictive**maintenance**and condition monitoring, nondestructive testing, research and development and manufacturing process control applications.
Flo-Tork...www.fox-ind.com
Contact: Pres Ch Eng, Carl W. Scheffel
Manufactures products for construction,**maintenance** , protection and restoration, including epoxies, coatings, rapid-set grouts, bearing pads and utility pole rehabilitation...Provides complete fabrication, stamping and manufacturing for industrial, mining, power generation and commercial construction and**maintenance** , 20-ton capacity and all types of coatings.
GE Aero Energy Products
PO Box 4414...

...aftermarket services for GE LM Pratt & Whitney, and Rolls-Royce aeroderivative gas turbines. Services include**maintenance** , repair, full engine overhaul, and on-site field**service**support.
GE**Company**
3135 Easton Tpke, Fairfield, CT 06431; 800-626-2004, FAX: 212-334-2463; URL: www...

...standby power applications. Manual and automatic systems from 2-to 30-kw and now Honda**generators** .
Generac**Power**Systems
Highway 59 & Hillside Rd, PO Box 8, Waukesha, WI 53187; 262-544-4811, FAX...gms@telerama.com;
URL: www.gmsinternational.com
Provides service, repair, retrofit, and upgrades of large **electrical generators** . This includes rotor and stator rewinds, retaining ring replacement, testing and inspection services.
Genertek International...

...664-9105; E-mail: info@gerardchimney.com; URL: www.gerardchimney.com
Specializes in the inspection,**maintenance** , and demolition of industrial chimneys, stacks and silos. Services are offered on a nationwide basis...

...46514; 219-264-9639; URL: www.gillettegenerators.com
Specializes in home and commercial standby emergency**power generator**sets using LPG, natural gas or diesel fuel. Offers sizes from 8- to 200-kW...203-359-9601; E-mail: goodway@goodway.com; URL: www.goodway.com
Provides power plant**maintenance**equipment, tube/pipe cleaners, boiler tube cleaners, condenser tube cleaners, vacuums, pressure washers, electronic descalling...

...E-mail: sales@gpsonline.com; URL: www.gpsonline.com
Provides enterprise asset management and computerized**maintenance** and materials management software systems, records/document management systems and related services worldwide.
Graftech Inc...

...and generator, low- and medium-voltage switchgear, and substation class transformer remanufacturing, engineering, and preventive**maintenance**

services.
Granite Construction Co
P0 Box 50024, Watsonville, CA 95077-5024; 831-722-2716, FAX...

...FAX: 708-206-0505; E-mail: info@graycor.com; URL: www.graycor.com
Provides construction,**maintenance**and facilities services throughout North America. (See ad page 118)
Griffin Gear Inc
P0 Box...systems for substation automation and industrial measurement and control applications, including fuel management and predictive**maintenance** .
Indeck Power Equipment Co
1111 S Willis Ave, Wheeling, IL 60090; 847-541-8300, FAX...

...URL: www.industrialchimneyengrs.com
Designs and manufactures services. Vortex shedding solutions and recommendations for chimney**maintenance**and life extension engineering.
Industrial Control Solutions Ltd
Enterprise House, Carlton Rd, Worksop, Notts, UK...9402; URL: www.irwinind.com
Provides mechanical, welding, instrumentation and fabrication services for retrofit, outage,**maintenance**and new construction projects at power plants and refineries in the western states.
ISA - The...katolight.com
Contact: Ind'l Sls Mgr, Tom Ferris Manufactures and assembles emergency stand-by**power generators**for virtually all applications. Generators range in size from 2.5-kW to 2.Mg...

...kssc@keystonepower.com; URL: www.keystonepower.com
Offers turnkey shop and field service for electrical**power** generation equipment including**generators** , turbines, exciters, regulators, controls and various equipment and other components.
Kim Hotstart Mfg
PO Box...electrical power market transformer products from 600-V to 550-kV for applications ranging from**generator**protection to metering **power**flow. Current ratings from 5- to 50,000-A on selected products.
Kurz Instruments Inc...mail: mhancock@louisallis.com
Serves the power generation industry with qualified contractors skilled in the**maintenance**and repair of large synchronous and induction electric motors, gas and steam turbine generators and...

...E-mail: info@mmengineering.com; URL: www.mmengineering.com
Provides engineering that helps clients decrease**maintenance** expenses, improve equipment performance and avoid industrial equipment failures.
The M&P Lab
2210 Technology...and constructs stave, jump- and slip-form silos and industrial storage silos. Offers repair and**maintenance**of silos.
Marine Biocontrol Corp
PO Box 636, Sandwich, MA 02540; 508-888-4431, FAX...

...net
Offers biofouling control services, cooling water treatment systems and diving services, including underwater inspection,**maintenance**and construction.
Markland Specialty Engineering Ltd
48 Shaft Rd, Toronto, Ontario, Canada M9W 4M2; 416...925-7400; E-mail: into@mcburney.com; URL: www.mcburney.com
Provides engineering, construction and**maintenance**of boiler and cogeneration systems, including package and field erected boilers. Fuels

include gas, oil...sheet linings, metallizing, corroglass and urethane applications. Also, metal fabrication and field site repair and **maintenance** .

Meter Conversions Inc

1620 W Main St, Houston, TX 77006-4712; 713-523-0515; E... 612-789-3541, FAX: 612-789-3540; E-mail: moorhead@mmbco.com

Offers field erection,**maintenance**services, repair and renovation fabrication for steam generation, pollution abatement, material handling, power generation, process...of professional services to the PP cogeneration and utility industries. These services include operation and**maintenance** , project management, plant staffing and consulting.

New Pig Corp

One Pork Ave, Tipton, PA 16684...

...814-684-0961; E-mail: hothogs@newpig.com; URL: www.newpig.com

Supplies cleaning and**maintenance**products for industrial facilities, provides solutions and technical expertise to customers to help **maintain**a clean and safe workplace.

New World Technologies

4374 Bridgeview St, Abbotsford, British Columbia, Canada...

...98027; 425-961-4700, FAX: 425-961-4646; URL: www.naes.com

Provides operations and**maintenance**services, related technical services, and contract personnel to the power generation industry.

North American Hydra...386-4004; E-mail: smokestacks@mindspring.com

Operates as a tall chimney contractor for inspections,**maintenance** , repairs, relining, reconstruction and demolition. Offers permanent ladders, balconies, lightning protection, cap replacement, washdowns and... 9060, FAX: 516-829-9557; E-mail: sales@pacsind.com; URL: www.pacsindustries.com

Provides**generators**switchgear,□power□center enclosures, substations, distribution switchgear.

Paktek Inc

7307-82nd St Ct SW, Tacoma, WA 98498...retrofit rotary valves. Rugged airlock fully cycles over three million times per year with minimum **maintenance** .

Plymouth Extruded Shapes

201 Commerce Ct, Hopkinsville, KY 42240; 270-886-6631, FAX: 270-886 ...

...dynamic balancing, as well as programs and emergency services. ISO-9002 certified.

PMSI (Power Plant**Maintenance**Services

660 W Baker St, Suite 217, Costa Mesa, CA 92626; 714-427-6900

Contact...alignment, high-density bolt heaters, induction bolt heating, portable power and specialty tooling.

Power Plant**Maintenance**(PPM)

1127 S Main St, PO Box 118, Society Hill, SC 29593; 843-378-4700...

...4339; E-mail: pdavis@jajones.com; URL: www.jajones.com

Provides fossil and nuclear plant**maintenance**and support services including mechanical, electrical and civil support for individual plants and system-wide...

...752-1132, FAX: 405-752-1133; E-mail: powersourcel@earthlink.net

Markets and appraises surplus**generators** ,□power□plants, boilers and transformers. Provides power project logistical support.

* Power Spares Inc

One S Ocean...

...www.powerfect.com
Offers heat exchanger service, including patented testing systems, plugging products, on-site**maintenance** , and repair backed by engineering consulting.
PowerFlow Engineering Inc 37120 Enterprise Dr, Westland, MI 48186...

...for repairs, on-site technical and contract services, replacement parts, upgrades, remanufactured, predictive, and corrective**maintenance**for variable speed fluid drives.
Powmat Ltd
321 Ushers Rd, Ballston Lake, NY 12019; 518...vibration screening tools, expert vibration analysis software, and advanced diagnostic data collectors and analyzers.
Predictive**Maintenance**Inspection
110 Castle Dr, PO Box 429, Madison, AL 35758-0429; 256-721-0100, FAX ...Offers industrial distributor and manufacturer representation and consultants providing products and programs utilized in predictive **maintenance**programs. Specializes in video inspection systems (CCD).
Quaker Chemical Corp
Elm & Lee Sts, Conshohocken, PA...raytek.com; URL: www.raytek.com
Designs, manufactures and markets temperature measurement instruments for industrial,**maintenance**and quality control applications.
RB Designs Inc
3225 Sunflower Way, Alpharetta, GA 30004; 770-619...space. Products include VLMs, horizontal and vertical carousels and pick-to-light systems.
Renewal Parts**Maintenance**
4485 Glenbrook Rd, Willowgaby, OH 44096; 216-946-0082, toll-free: 800-446-4776, FAX...
...rigging@worldnet.att.net; URL: www.riggininternational.com
Provides heavy lift rigging and heavy transportation,**electrical** installation, nuclear steam**generator**replacement services, and nuclear decommissioning services.
Ripley Co
46 Nooks Hill Rd, Cromwell, CT 06416...

3/TI,KWIC/5 (Item 2 from file: 148)

Turn emergency generators into dollars.

... and connects the generator to the downsized load. When the grid can again supply full**power** , the standby□generator□is disconnected and the full load is reconnected to the grid.
Because the power seldom...

...of high power usage the grid may not be able to supply sufficient power to**maintain**the desired load. In this situation, power generated at a customer's site reduces the...

...demand. To ensure this, the energy management service provider takes over complete responsibility for the**maintenance**of the equipment at each **location** . Regular□maintenance□visits, coupled with continuous monitoring and testing from the**remote**dispatch center, combine to assure reliability of the equipment.
In practice, a system is set...

...for this specialized extra capacity in proportion to the total capacity.
The energy manager designs,**installs**and operates the special equipment needed to connect the**generators**to the grid, and the

additional equipment needed to remotely control and monitor each**generator** and its**power**production.

Figure 2 shows how both the electrical and the money paths are linked in...

...offer that's difficult to refuse. The factory further benefits from the reduced cost of**maintaining**its standby equipment. Moreover, at such time as the standby generator does turn on, the...

...The availability of wholesale wheeling suggests that there will always be cheaper power available than**power**produced from standby□generators□ in factories. But it is important to remember that the grid is subject to transmission...might exceed $2,000/kW. By comparison, the necessary instrumentation and control of an already-**installed**diesel□generator□ costs from $100 to $250/kW. This constitutes a substantial incentive, and herein lies the...

...value of having an extra kW capacity likewise exceeds $100/yr. If the energy management**service company**charges the utility only half that, it is a good deal for the utility.

Next...

...of roughly three years, or an internal rate of return (IRR) of 27 percent. When**maintenance**costs are included (perhaps $2/kW annually), the effective payment to the generator owner rises...

...logged.

The next step was to test the controller system with a large (300 kW) **generator** . Cummins Northwest in Renton, Wash., has□installed□Onan parallel switching equipment designed to seamlessly connect the 300 kW **generator**to its internal load. This means the□generator□will be synchronized to the grid and then connected. Equipment is**installed**to guard against ground faults and other potential failure modes, such as unintentionally providing power to the grid. Typically, the**generator** will be powered up to carry the entire load from the grid before disconnecting. Power-quality monitoring equipment was**installed**to verify that the system was not perturbing either the load or the grid. This...

3/TI,KWIC/6 (Item 3 from file: 148)

CTIA exhibitor update. (Cellular Telecommunications Industry Association convention guide)

... Alexander manufactures replacement batteries and battery **maintenance**equipment for cellular phones, laptop computers, 2-way, bio-medical and professional video industries. Established...which is a Spanish language magazine for professionals in wireless communications in Latin America.

CELLULAR**SERVICE**

BOOTH 1936**Company**profile...The company provides various products for companies that own and/or**maintain**tower systems: antennas, hardware, mounts, replacement radome covers and installation hardware. New products ...The company will introduce Profile, a series of databases that**maintain** information on individuals and business entities who have created significant write-offs or shut-offs...communications buildings and shelters, mobile communications systems, COWs, fiber-optic splicing trailers, standby power services,**power**restoration trailers,□generators□ ,**generator**buildings and custom loadbanks. New products...or custom-manufactured portable communication shelters; premiere mobile system

(cell on wheels) with tower and**generator installed** ; and professional radio equipment installation.

FILTRONIC COMTEK LTD.
BOOTH 2950
FIRST COLLECTIONS
BOOTH 2902
FLASH...

3/TI,KWIC/7 (Item 1 from file: 348)

Electricity generation equipment management system
Verwaltungssystem fur Elektrizitatgeneratorausrustung
Systeme de gestion d'equipement de generation d'electricite

...ABSTRACT A2

A**generator**unit is□installed□locally to supply power to an electricity consumer. A management centre monitors operation status of the**generator**unit and monitors the amount of electricity supplied to the electricity consumer by the generator unit. A**service company** performs**maintenance**and management for the generator unit based on instructions from the management centre or the...

...SPECIFICATION to an electricity generation equipment management system that efficiently maintains and manages operation of a**generator**unit **installed**in a region where laying of electricity cable from a public electricity company is difficult...

...pay the power companies a fee based on the amount of electricity used.

However, in**places**such as farms in large plains or□remote□islands, the laying of electrical cable from the power company involves enormous installation costs. This...

...to these consumers very difficult in practical terms. Electricity consumers in these remote areas can**install**a□generator□unit, using petroleum as an energy source, to serve as a home**generator** . Alternatively, solar energy, wind energy, or geothermal energy can be used to generate electricity.

However,**installing**home□generators□involves very high installation costs. Furthermore, there are very high operation costs (running costs) for...

...home generator and running the generator in a stable and efficient manner while providing adequate**maintenance** . Thus, the efficient use of electrical energy is made very difficult.

It is an object...

...object of the present invention to provide an electricity generation equipment management system that allows**power**generated from a **generator**unit□installed□locally to be used in the same manner as power supplied from an electric company...

...invention is to provide an electricity generation equipment management system that maintains and manages a**generator**unit□installed□locally in a region for which laying electrical cable from the electricity company is difficult...

...supply service fees charged to the electricity consumer.

Briefly stated, the present invention provides a**generator**unit

installedlocally to supply power to an electricity consumer. A management centre monitors operation status of the**generator**unit and monitors the amount of electricity supplied to the electricity consumer by the generator unit. A**service company**performs□maintenance□and management for the generator unit based on instructions from the management centre or the...

...above, an electricity generation equipment management system according to the present invention includes a locally**installed generator**unit operated by an electricity provider, supplying electricity to a specific electricity consumer; and a...

...In an electricity generation equipment management system according to an embodiment the present invention, a**service company**maintains and manages operation of the generator unit based on instructions from the management centre...

...the electricity consumer is monitored by a management centre via a predetermined communication circuit. A**service company**that maintains and manages the operations of the generator unit receives**maintenance** /management instructions from the management centre or receives information about operation status of the generator unit. Based on this, the**service company**performs□maintenance□and management operations for the generator unit. Apart from the**maintenance**and management of the generator system performed by the**service company** , the electricity provider bills and receives payment from the electricity consumer for an electricity supply...

...liquid petroleum fuel), NP (natural gas), or the like as fuel to generate electricity. The**service company**includes a fuel supply company supplying fuel (LPG or NP) to the fuel cell electricity generation device (fuel cell system); and a**maintenance** /management company performing**maintenance**on the fuel cell electricity generation device and responding to irregularities in the fuel cell...a specific electricity consumer as a home generator system in a region where laying or**maintaining**electrical cable from a public electricity company is difficult, e.g., in a wide plain...

...operation status of the fuel cell electricity generating device via a predetermined network; and a**service company maintaining**and operating the fuel cell electricity generating device based on instructions received from the management centre or the operation status of the fuel cell electricity generating device.

The**service company**includes a database, storing information about irregularities issued from the fuel cell electricity generating device in association with information relating to a**service company** corresponding to the irregularity information; and means for notifying the**service company**associated with the irregularity by looking up the database if an irregularity in the fuel cell electricity generating device is detected. Notifications to the**service company**regarding irregularities are provided via e-mail and includes information such as the model type...

...supply power to the electricity consumers 2a, 2b respectively. The electricity generation unit 1a is**installed**locally as a home electricity**generator**for a standard household (electricity consumer 2a) located in a city area A in an...

...shown in the figure) can be provided via power cables. Electricity generation unit 1b is**installed**locally as a□generator□for a standard household (electricity consumer 2b) located in a remote area B, e.g...

equipped with an electricity provider 4 operating generator units 1a, 1b, and service companies, providing**maintenance**and management for generator units 1a, 1b. These service companies can include fuel supply companies...

...sites of generator units (fuel cell generators) 1a, 1b. These service companies can also include**maintenance**management companies 6a, 6b, providing**maintenance**operations such as going to the sites of generator units (fuel cell generators) 1a, 1b...

...communication between generator units 1a, 1b, electricity provider 4, fuel supply companies 5a, 5b, and**maintenance** /management firms 6a, 6b. Establishing a direct information communication link between**generator** unit 1b and management network system BNS is difficult since**generator** unit 1b is**installed**in remote area B, where even the laying of power cables is difficult. Thus, information...

...the amount of power used by electricity consumers 2a, 2b, i.e., the amount of**power**supplied individually by□generator□units 1a, 1b. Furthermore, to provide a third feature, management centre 3 uses management network...

...to generator units 1a, 1b. Furthermore, to provide a fourth feature, management centre 3 instructs**maintenance** / management companies 6a, 6b to respond to irregularities in generator units 1a, 1b and to...

...3 via a communication device 19 at regular intervals, e.g., once a day. For**generator**unit 1b,□installed□in the remote area B, information is sent to management centre 3 via communication satellite...equipped with a database DB that manages device specifications x for generator units 1a, 1b;**maintenance**information y; and information z regarding the service companies performing**maintenance** /management operations; and the like. Management centre 3 uses this database DB to provided unified...
...units 1a, 1b collected as described above. This information is sent to the corresponding department (**service company**).

More specifically, management centre 3 may, for example, notify the amount of power supplied to...

...1b, and instructs them to provide re-fills. Furthermore, management device 3 sends information to**maintenance** /management companies 6a, 6b, e.g., information about problems or irregularities in generator units (fuel...

...as determined by analysis of the activity information described above, and instructs them to provide**maintenance**operations, e.g., respond to the problems.

It is also possible to have the activity information itself (the raw data) sent from management centre 3 to**maintenance** /management companies 6a, 6b, and to instruct**maintenance** /management companies 6a, 6b to perform analysis and provide**maintenance**based on the analysis.

Referring to Figure 5, management centre 3 prepares a set of...

...databases. A database DB1 contains machine specifications x and information destinations z. Database DB2 contains**maintenance**contents y for the individual generator units (fuel cell generator) 1a, 1b handled by**maintenance** /management companies 6a, 6b. This allows management information to be distributed between multiple databases DB1...

...deliver fuel tanks, to their respective generator units (fuel cell generators) 1a, 1b. Based on**maintenance**instructions or information

about irregularities received from management centre 3, **maintenance** /management companies 6a, 6b go on-site and provide **maintenance** to their respective generator units (fuel cell generators) 1a, 1b. More specifically, failed or defective...

...to the Internet INT via communication satellite CS or a wireless station RS.

With the **generator** equipment management system described above, electricity is supplied using locally **installed generator** units 1a, 1b for electricity consumers 2a, 2b. This allows **generator** units 1a, 1b to be used efficiently as home generators. In particular, in remote area ...

...where laying of electricity cables is difficult, power is supplied relatively inexpensively and easily from **generator** unit 1b□installed□ for electricity consumer 2b.

The operation status of **generator** units 1a, 1b are monitored by management centre 3, and, when necessary, instructions are sent to fuel supply companies 5a, 5b and **maintenance** /management companies 6a, 6b to supply fuel (LPG or NP) or provide **maintenance** for generator units 1a, 1b. As a result, generator units 1a, 1b easily provide stable...

...so the power capacity (charge capacity) of backup power supply 17 must be sufficiently large.

Maintenance operations for generator units 1a, 1b do not have to all be handled by service...

...that can be performed by electricity consumers 2a, 2b may be dealt with by sending **maintenance** information and instructions to electricity consumers 2a, 2b from management centre 3, e.g., via the Internet INT. Furthermore, **maintenance** operations for generator units 1a, 1b can be carried by the **maintenance** management companies 6a, 6b at fixed intervals, while irregularities, such as gas leaks, are dealt...

...the present invention as described above, electricity is supplied in a stable manner from a **generator** unit□installed□for an electricity consumer, even if laying of electricity cables from a public power company...

...a management centre. Based on this monitoring, instructions are sent to service companies to provide **maintenance** operations for the generator unit, e.g., supplying fuel and performing **maintenance** inspections. This allows the generator unit to be operated in an efficient manner. Furthermore, accounting...

...generator unit and the electricity company. These accounting operations are performed separate from the operations/**maintenance** tasks for the generator unit. Thus, the electricity provider can conduct business in a reliable...

...CLAIMS equipment management system according to Claim 1, characterised in that the said at least one **generator** unit is□installed□locally with respect to the said at least one electricity consumer.

3. An electricity generation...

...according to any of Claims 1 to 3, characterised in that it further comprises:

a **service company maintaining** and managing operation of said at least one generator unit; and

said **service company** receiving instructions from said management centre.

5. An electricity generation equipment management system according to...

...wherein:
said at least one generator unit is a fuel cell electricity generating device;
said**service company**includes a fuel supply company and a **maintenance** /management company;
said fuel supply company supplying fuel to said fuel cell electricity generating device; and
said**maintenance** /management company performing□maintenance□on said fuel cell electricity generating device and responding to irregularities in said fuel cell...

...generation equipment management system as described in any preceding claim wherein:
said at least one**generator**unit is□installed□for said at least one specific electricity consumer in a region where laying or **maintaining**electrical cable from said electricity provider is difficult; and
said management centre uses wireless communication...

...said at least one fuel cell electricity generating device via a predetermined network; and
a**service company maintaining**and operating said fuel cell electricity generating device based on instructions received from said management...

...at least one fuel cell electricity generating device in association with information relating to said**service company**corresponding to said irregularity information; and
means for notifying said**service company**associated with said irregularity by looking up said database upon detection of an irregularity in...

...The electricity management system as described in Claim 11 or Claim 12 further comprising:
a**service company maintaining**and managing operation of said generator unit; and
said**service company**receiving instructions from said management centre.
14. An electricity management system according to any of...

...11 to 13 wherein:
said generating means includes a fuel cell electricity generating device;
said**service company**includes a fuel supply company and a **maintenance** /management company;
said fuel supply company supplying fuel to said fuel cell electricity generating device; and
said**maintenance** /management company performing□maintenance□on said fuel cell electricity generating device and responding to irregularities in said fuel cell...generator unit, and transmitting information on the operating status of the generator unit to a **service company**to enable a requirement for□maintenance□ operations to be determined.

3/TI,KWIC/8 (Item 1 from file: 624)

Technical Information Center. : Literature on products and services for powerplant design, operation, andmaintenance

: Literature on products and services for powerplant design, operation, andmaintenance

TEXT:
... fit all manufacturers' ESPs. Controls can help users realize up to 60% power savings, reduce**maintenance** , and improve precipitator performance and reliability.--Research-Cottrell.
Analyzers
Series 1200 oxygen analyzer provides continuous...

...refuse into useful energy.--Detroit Stoker Co.
Boiler repair
Brochure details company's comprehensive power **maintenance**services, positioned to support a deregulated market. Firm has over 20 years of safe, reliable... the full range of higher level management and advanced control functions, including simulation and production,**maintenance** , historian, and network management.--Elsag Bailey Process Automation, Bailey Hartmann & Braun.
Independent power producers (IPPs...

... and performance of electric motors on critical processes and equipment. Empath allows more cost-effective **maintenance**planning and has helped pinpoint problems within the industry.--Framatome Technologies.
Designed for airborne and...

... air-operated and check valves. Rugged, computerized system is readily adaptable for a comprehensive valve **maintenance** program.--Framatome Technologies.
Line of OilView diagnostic equipment, advanced fluid analysis laboratory, and extensive startup...

...operator exposure. They increase productivity and efficiency by reducing filter element disposal, replacement costs, and**maintenance**costs. These units use standard filter bags as the element. They automatically sense when the...

...times.--Chemetron Fire Systems.
If your low-pressure CO subscript 2 fire extinguishing system requires **service**or replacement,□company□recommends a retrofit conversion of the refrigeration unit to the refrigerant HFC R-404A, if...
... action (rather than attrition), fines production is kept to a minimum.--ABB Air Preheater Inc.
Generators
Mobile **generator** sets deliver the lowest□installed□price per kilowatt and the fastest delivery time in the industry, says company, which manufactures...

... engineering staff, company provides customized heating solutions, using advanced heat-related services and technology, and **maintaining** an industry-leading safety record.--Cooperheat.
Brochure describes the heat-related products and services that... described.--Hach Co.
Measuring moisture levels in oil is an essential element of a comprehensive **maintenance**program. It provides information on the serviceability of the oil and relates to the temperature...

... multipoint dust detection system connects up to 255 points for total

system preventive monitoring. Nearly**maintenance** -free, the CPM 5000 uses a divergent laser or LED light beam that gives accurate...

... trained team of technicians and professionals is available for full-spectrum startup, plant operation, and**maintenance**service.--Enron Power Corp.
Major player in the development, design, startup, operation, and **maintenance** of independent and cogeneration powerplants offers services to suit user needs. It will custom-design...

...controls.--Extol of Ohio Inc.
Jacking system
PowerLift system handles high-tonnage lifting jobs in**remote locations** . Specially designed cart allows workers to transport pump, high-tonnage jack, and accessories together, without...

... droplets, over 99% of submicron sizes, company says, at the same time reducing downtime for**maintenance** . Since the eliminators have no moving parts to wear out, they last indefinitely without **maintenance** or replacement parts.--Koch Engineering Co.
O&M services
International company specializes in operating and **maintaining** gas-turbine combined-cycle, coal-fired, and diesel powerplants. Plant availability averages 97%; steam reliability has been 100%.--Indeck Operations Inc.
Company's core business is power**maintenance** . Brochure details full range of direct hire services to nuclear and fossil-fired powerplants including all mechanical and**electrical**work, turbine/□generator□inspections and overhauls, asbestos abatement, scaffolding, and instrumentation and controls. Firm reports that it is...

... Company is a system integrator of technology for buried-pipe rehabilitation projects, using methods that**maintains**system integrity by selecting cost-effective methods for coatings, liners, ...Rand Rental Equipment.
Seals
Viton fluoroelastomers can help reduce costs by preventing sealing failures, extending**maintenance**intervals, handling aggressive fluids and high temperatures, increasing safety, and meeting stringent environmental regulations.--DuPont...

... generation client/server application with robust functionality and unmatched scaleability. It includes modules for asset **maintenance** , workforce management, inventory, procurement, and the Curator electronic document management/workflow system.--Indus TSW, formerly...dioxide without use of chemicals. Advantages over conventional removal methods include small space requirements, low **maintenance** and operating cost, and no introduction of contaminant sources.--Ecolochem Inc.
New line of TFC...
?

T S3/9/7

3/9/7 (Item 1 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

01423900
Electricity generation equipment management system
Verwaltungssystem fur Elektrizitatgeneratorausrustung
Systeme de gestion d'equipement de generation d'electricite
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PATENT (CC, No, Kind, Date): EP 1202594 A2 020502 (Basic)
APPLICATION (CC, No, Date): EP 2001308683 011012;
PRIORITY (CC, No, Date): JP 2000313232 001013
DESIGNATED STATES: AT; BE; CH; CY; DE; DK; ES; FI; FR; GB; GR; IE; IT; LI; LU; MC; NL; PT; SE; TR
EXTENDED DESIGNATED STATES: AL; LT; LV; MK; RO; SI
INTERNATIONAL PATENT CLASS: H04Q-009/00

ABSTRACT EP 1202594 A2
A**generator**unit is□installed□locally to supply power to an electricity consumer. A management centre monitors operation status of the**generator**unit and monitors the amount of electricity supplied to the electricity consumer by the generator unit. A**service company** performs**maintenance**and management for the generator unit based on instructions from the management centre or the operation status of the generator unit. An electricity provider operating the generator unit bills the electricity consumer for an electricity supply service fee based on information sent to the management centre. The resulting electricity generation equipment management system maintains and manages a generator unit without placing a burden on an electricity consumer, allowing efficient billing and payment of electricity supply service fees.
ABSTRACT WORD COUNT: 121
NOTE:
Figure number on first page: 1
LEGAL STATUS (Type, Pub Date, Kind, Text):
Application: 020502 A2 Published application without search report
LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	200218	972
SPEC A	(English)	200218	3993
Total word count - document A			4965
Total word count - document B			0
Total word count - documents A + B			4965

SPECIFICATION EP 1202594 A2

The present invention relates to an electricity generation equipment management system that efficiently maintains and manages operation of a generatorunitinstalledin a region where laying of electricity cable from a public electricity company is difficult. The present invention also relates to an electricity generation equipment management system that supplies power to a specific electricity consumer, allowing for reliable billing and payments of electricity supply service fees between the electricity consumer and an electricity provider operating the generator unit.

Electricity generated using nuclear power, thermal power, water power, or the like serves a very important role as a source of daily energy. There is also widespread use of electrical devices, actuating devices in various machinery, information communication devices, and the like that use this electricity as an energy source to provide light or heat.

This type of electricity is generated by power companies, which supply electricity consumers, e.g., businesses and standard households, via predetermined electrical cables. The electricity consumers pay the power companies a fee based on the amount of electricity used.

However, inplacessuch as farms in large plains orremoteislands, the laying of electrical cable from the power company involves enormous installation costs. This makes providing electricity to these consumers very difficult in practical terms. Electricity consumers in these remote areas caninstallageneratorunit, using petroleum as an energy source, to serve as a homegenerator . Alternatively, solar energy, wind energy, or geothermal energy can be used to generate electricity.

However,installinghomegeneratorsinvolves very high installation costs. Furthermore, there are very high operation costs (running costs) for monitoring the operation status of a home generator and running the generator in a stable and efficient manner while providing adequate maintenance . Thus, the efficient use of electrical energy is made very difficult.

It is an object of the present invention to provide an electricity generation management system which overcomes the foregoing problems.

It is a further object of the present invention to provide an electricity generation equipment management system that allowspower generated from ageneratorunitinstalledlocally to be used in the same manner as power supplied from an electric company, even if the laying of electric cable from the electricity company is difficult in the region.

Another object of the present invention is to provide an electricity generation equipment management system that maintains and manages a generatorunitinstalledlocally in a region for which laying electrical cable from the electricity company is difficult, without placing a burden on the electricity consumer; and that can efficiently handle billing and payments of electricity supply service fees charged to the electricity consumer.

Briefly stated, the present invention provides ageneratorunit installedlocally to supply power to an electricity consumer. A management centre monitors operation status of thegeneratorunit and monitors the amount of electricity supplied to the electricity consumer by the generator unit. Aservice companyperformsmaintenanceand management for the generator unit based on instructions from the management centre or the operation status of the generator unit. An electricity provider operating the generator unit bills the electricity consumer for an electricity supply service fee based on information sent to the management centre. The resulting electricity generation equipment management system maintains and manages a generator unit without placing a burden on an electricity consumer, allowing efficient billing and payment of electricity supply service fees.

In order to achieve the objects described above, an electricity

generation equipment management system according to the present invention includes a locally**installed generator**unit operated by an electricity provider, supplying electricity to a specific electricity consumer; and a management centre monitoring operation status of the generator unit, monitoring an amount of electricity supplied to the specific electricity consumer by the generator unit. The electricity provider bills an electricity supply service fee to the specific electricity consumer based on information received from the management centre via a predetermined network system, and the electricity consumer pays the service fee.

In an electricity generation equipment management system according to an embodiment the present invention, a**service company**maintains and manages operation of the generator unit based on instructions from the management centre or the operation status of the generator unit.

Thus, in the electricity generation equipment management system according to the present invention, a generator unit for supplying electricity to the electricity consumer is set up in association with the electricity provider instead of the electricity consumer. The operation status of the generator unit and the amount of electricity supplied to the electricity consumer is monitored by a management centre via a predetermined communication circuit. A**service company**that maintains and manages the operations of the generator unit receives**maintenance** /management instructions from the management centre or receives information about operation status of the generator unit. Based on this, the**service company**performs□maintenance□and management operations for the generator unit. Apart from the**maintenance**and management of the generator system performed by the**service company** , the electricity provider bills and receives payment from the electricity consumer for an electricity supply service fee based on the amount of power supplied to the electricity consumer or the like.

The generator unit can be, for example, a fuel cell electricity generation device that uses LPG (liquid petroleum fuel), NP (natural gas), or the like as fuel to generate electricity. The**service company** includes a fuel supply company supplying fuel (LPG or NP) to the fuel cell electricity generation device (fuel cell system); and a**maintenance** /management company performing**maintenance**on the fuel cell electricity generation device and responding to irregularities in the fuel cell electricity generation device.

According to another aspect of the electricity generation equipment management system according to the present invention, the generator unit is especially effective when used locally by a specific electricity consumer as a home generator system in a region where laying or **maintaining**electrical cable from a public electricity company is difficult, e.g., in a wide plain or a remote island.

In this case, it would be desirable for the management centre to use wireless communication equipment to collect information from the generator unit regarding operation status of the generator unit and regarding an amount of electricity supplied to the specific electricity consumer. The electricity provider would then use, for example, the Internet for billing and payment of an electricity supply service fee for the specific electricity consumer.

Furthermore, according to another aspect of the present invention the electricity generation equipment management system includes a locally installed fuel cell electricity generating device supplying electricity to a specific electricity consumer; a management centre monitoring an operation status of the fuel cell electricity generating device via a predetermined network; and a**service company maintaining**and operating the fuel cell electricity generating device based on instructions received from the management centre or the operation status

of the fuel cell electricity generating device.

The **service company** includes a database, storing information about irregularities issued from the fuel cell electricity generating device in association with information relating to a **service company** corresponding to the irregularity information; and means for notifying the **service company** associated with the irregularity by looking up the database if an irregularity in the fuel cell electricity generating device is detected. Notifications to the **service company** regarding irregularities are provided via e-mail and includes information such as the model type of the fuel cell electricity generating device in which the irregularity occurred, the site location (address), the nature of the irregularity, and the like.

The above, and other objects, features and advantages of the present invention will become apparent from the following description read in conjunction with the accompanying drawings, in which like reference numerals designate the same elements.

Figure 1 is a schematic drawing of the overall architecture of an electricity generation equipment management system according to an embodiment of the present invention.

Figure 2 is a schematic drawing of the architecture of a fuel cell generator, which is one example of a generator unit.

Figure 3 is a drawing illustrating sample operation status information for a generator unit monitored by a management centre.

Figure 4 is a drawing illustrating a sample database in a management centre for managing operations of a generator unit.

Figure 5 is a drawing illustrating a sample database, distributed between a management centre and service companies, for managing information to operate generator units.

Referring to the figures, the following is a description of an electricity generation equipment management system according to an embodiment of the present invention.

Referring to Figure 1, there is shown the schematic architecture of an electricity generation equipment management system according to this embodiment. Electricity generation units 1a, 1b are disposed separately and are associated with electricity consumers 2a, 2b, e.g., standard households. Electricity generation units 1a, 1b supply power to the electricity consumers 2a, 2b respectively. The electricity generation unit 1a is **installed** locally as a home electricity□generator□for a standard household (electricity consumer 2a) located in a city area A in an electricity service area to which power from a public power company (not shown in the figure) can be provided via power cables. Electricity generation unit 1b is **installed** locally as a□generator□for a standard household (electricity consumer 2b) located in a remote area B, e.g., a remote island or large plain for which installation of power cables from a public power company is difficult.

Referring to the schematic architecture shown in Figure 2, electricity generation units 1a, 1b are formed as fuel cell generators (fuel cell systems) in which LPG (liquid petroleum gas) or NP (natural gas) is used as fuel and an electrochemical reaction is performed with the hydrogen in the fuel and oxygen in air to generate electricity (power). Briefly, this fuel cell generator is essentially formed from a fuel reforming device 11, a carbon monoxide (CO) transformer 12, and a fuel cell 13. Also included are a water processor 14, a cooling water tank 15, and a DC-AC converter (inverter) 16.

Fuel reforming device 11 performs vapor reformation on the LPG or NP supplied as fuel to provide a gas having hydrogen as its primary component. More specifically, the LPG or the NP is heated using a heat exchanger (not shown in the figure) or the like. A water-adding/desulfurizing device (not shown in the figure) is used to eliminate sulfur components contained in the gas. Then, the gas is sent

to fuel reforming device 11 along with water vapor, providing a gas having hydogen (H2))) as its main component. Then, this hydrogen gas is sent to carbon monoxide transformer 12, where the carbon monoxide (CO) contained in the gas is converted to carbon dioxide (CO2))). The hydrogen gas processed in this manner is then sent to the fuel electrode of fuel cell 13 while air is sent to the air electrode of fuel cell 13 simultaneously. The oxygen in this air and the hydrogen in the hydrogen gas forms an electrochemical reaction that generates electricity (direct current electricity).

Hydrogen is consumed in fuel cell 13 in the by the electrochemical reaction (e.g., 80%), and the remaining hydrogen is discharged along with the carbon dioxide as an unreacted gas. This unreacted gas is returned to fuel reforming device 11 to serve as a heat source.

The cooling device built into fuel cell 13 cools fuel cell 13 by introducing cooling water from cooling tank 15. The cooling water that is heated by fuel cell 13 then returns to cooling tank 15 by way of the heat exchanger (not shown in the figure), thus allowing it to be used for both heating the hydrogen gas and cooling the heated water. Water processor 14, described above, supplies water to cooling tank 15 and serves as a water source for providing the water vapor sent to fuel reforming device 11. Water processor 14 does this by, for example, purifying tap water or well water.

The direct current electricity (DC) generated by fuel cell 13 is converted using DC-AC converter 16 formed from an inverter to provide an alternating current (AC) at a predetermined frequency and voltage. This is sent out as the generated output to electricity consumers 2a, 2b.

Fuel cell generators formed in this manner may be equipped with a backup power supply 17 that includes a secondary battery. Backup power supply 17 stores electrical energy by being charged by the output from fuel cell 13. If there is an irregularity in fuel cell 13, or if there is a sudden increase in power consumption that cannot be met by the output, electrical energy from backup power supply 17 is sent to DC-AC converter 16 in place of fuel cell 13. This provides output of AC power for a predetermined length of time. This type of backup power supply 17 provides backup over a predetermined period in case of a failure due to a irregularity in the fuel cell generator or due to a spike in power consumption, thus guaranteeing a stable supply of power to electricity consumers 2a, 2b.

Referring back to Figure 1, characteristic features of a generator equipment management system will be described. A management centre 3 is disposed in the city area A to monitor the operations of generator units 1a, 1b, and to monitor the power supplied to electricity consumers 2a, 2b from generator units 1a, 1b.

City area A is also generally equipped with an electricity provider 4 operating generator units 1a, 1b, and service companies, providing **maintenance** and management for generator units 1a, 1b. These service companies can include fuel supply companies 5a, 5b supplying fuel by delivering fuel containers (tanks) filled to a predetermined pressure to the sites of generator units (fuel cell generators) 1a, 1b. These service companies can also include **maintenance** management companies 6a, 6b, providing **maintenance** operations such as going to the sites of generator units (fuel cell generators) 1a, 1b when there is an irregularity in a fuel cell generator and re-filling or replacing consumables in the fuel cell generators.

Management centre 3 provides unified management over a predetermined management network system BNS by providing information communication between generator units 1a, 1b, electricity provider 4, fuel supply companies 5a, 5b, and **maintenance** /management firms 6a, 6b. Establishing a direct information communication link between **generator** unit 1b and management network system BNS is difficult since **generator** unit 1b is

installedin remote area B, where even the laying of power cables is difficult. Thus, information communication is provided, for example, using a communication base station BS connected to management network system BNS via a communication satellite CS.

Management centre 3 is entrusted by electricity provider 4 to provide operation management over generator units 1a, 1b. This operations management is performed in the following manner. To provide a first feature, management centre 3 collects, via management network system BNS, information regarding the operation status of generator units 1a, 1b, described later; and information regarding the amount of power supplied to power consumers 2a, 2b. Then, the information collected from generator units 1a, 1b is organized by generator unit and stored, thus allowing the activity status of generator units 1a, 1b to be monitored individually.

To provide a second feature, management centre 3 reports to electricity provider 4, via management network system BNS, regarding the amount of power used by electricity consumers 2a, 2b, i.e., the amount of**power** supplied individually by**generator**units 1a, 1b. Furthermore, to provide a third feature, management centre 3 uses management network system BNS to instruct fuel supply companies 5a, 5b to provide fuel to generator units 1a, 1b. Furthermore, to provide a fourth feature, management centre 3 instructs**maintenance** / management companies 6a, 6b to respond to irregularities in generator units 1a, 1b and to re-fill/replace consumables and the like.

The collection of information from generator units 1a, 1b according to the first feature described above will be described in more detail.

Referring to Figure 3, if generator units 1a, 1b are formed as fuel cell generators as described above, generator units 1a, 1b are equipped with sensing features. The sensing mechanism is equipped with a status detector 18 that detects the remaining fuel (LPG or NP) supplied in the fuel tanks described above. Status detector 18 also detects gas leaks in the fuel gas supply system between fuel reforming device 11 and fuel cell 13. Status detector 18 also detects the concentration of hydrogen in the hydrogen gas output from fuel reforming device 11; the concentration of carbon monoxide in the hydrogen gas from carbon monoxide (CO) transformer 12; the output voltage (DC voltage) from fuel cell 13; and output voltage (AC voltage) from AC-DC converter 16. Furthermore, status detector 18 also detects the charge in backup power supply 17; information about the water quality and the like of the processed water from water processor 14; and the amount of power supplied to power consumers 2a, 2b from the fuel cell generator devices.

The information detected by status detector 18, along with ID information assigned to the corresponding generator unit, is sent to management centre 3 via a communication device 19 at regular intervals, e.g., once a day. For**generator**unit 1b,□installed□in the remote area B, information is sent to management centre 3 via communication satellite CS as described above. Of course, it would also be possible to have management centre 3 access communication device 19, which would then send the detection information collected up to that point or the detection information for the time of access.

Management centre 3 receives detection information relating to activity status from generator units 1a, 1b in this manner.

Referring to Figure 4, management centre 3 is equipped with a database DB that manages device specifications x for generator units 1a, 1b; **maintenance**information y; and information z regarding the service companies performing**maintenance** /management operations; and the like. Management centre 3 uses this database DB to provided unified management over the information collected from generator units 1a, 1b as described above. Furthermore, by looking up the database DB information, management centre 3 determines where to report the detected information regarding the activity status of generator units 1a, 1b collected as described

above. This information is sent to the corresponding department (**service company**).

More specifically, management centre 3 may, for example, notify the amount of power supplied to power consumers 2a, 2b to electricity provider 4 on a monthly basis. Also, management centre 3 informs fuel supply companies 5a, 5b about the remaining fuel in generator units (fuel cell generators) 1a, 1b, and instructs them to provide re-fills. Furthermore, management device 3 sends information to**maintenance** /management companies 6a, 6b, e.g., information about problems or irregularities in generator units (fuel cell generators) 1a, 1b as determined by analysis of the activity information described above, and instructs them to provide**maintenance**operations, e.g., respond to the problems.

It is also possible to have the activity information itself (the raw data) sent from management centre 3 to**maintenance** /management companies 6a, 6b, and to instruct**maintenance** /management companies 6a, 6b to perform analysis and provide**maintenance**based on the analysis.

Referring to Figure 5, management centre 3 prepares a set of relational databases. A database DB1 contains machine specifications x and information destinations z. Database DB2 contains**maintenance**contents y for the individual generator units (fuel cell generator) 1a, 1b handled by**maintenance** /management companies 6a, 6b. This allows management information to be distributed between multiple databases DB1, DB2.

Fuel supply companies 5a, 5b then respond to the fuel supply instructions from management centre 3 and supply fuel (LPG or NP), i.e., deliver fuel tanks, to their respective generator units (fuel cell generators) 1a, 1b. Based on**maintenance**instructions or information about irregularities received from management centre 3,**maintenance** /management companies 6a, 6b go on-site and provide**maintenance**to their respective generator units (fuel cell generators) 1a, 1b. More specifically, failed or defective sections in the fuel cell generators are repaired or replaced and consumables are replaced or re-filled.

In response to information from management centre 3 regarding the amount of power supplied, electricity provider 4 bills electricity consumers 2a, 2b for electricity supply services. The electricity supply service fees vary according to the provider contract. For example, a set electricity fee is associated with the amount of electricity supplied. Additional charges may optionally be applied for fuel supplied to the fuel cell generators and for consumables. In fixed-rate contracts, a fixed rate is charged up to a predetermined amount of power described in the contract, and additional power used is charged with an additional fee. Essentially, the electricity supply service fee is charged according to the provider contract, based on the amount of power used by electricity consumers 2a, 2b, the operating costs of the fuel cell generators, and the like. Accounting operations are carried out by receiving the electricity supply service fees from electricity consumers 2a, 2b.

The billing and payment of these electricity supply service fees can be performed through the mailing of bills and the depositing of the fees. However, it is also possible to use the Internet INT as shown in Figure 1. In this case, a virtual financial institution BK in the Internet INT is used to provide transactions with electronic money information. The use of this type of transaction format simplifies billing and payment of electricity supply service fees, especially for power consumer 2b in remote area B. In this case, power consumer 2b connects to the Internet INT via communication satellite CS or a wireless station RS.

With the**generator**equipment management system described above, electricity is supplied using locally**installed generator**units 1a, 1b for electricity consumers 2a, 2b. This allows**generator**units 1a, 1b to be used efficiently as home generators. In particular, in remote area

B, where laying of electricity cables is difficult, power is supplied relatively inexpensively and easily from **generator** unit 1b□installed□ for electricity consumer 2b.

The operation status of **generator** units 1a, 1b are monitored by management centre 3, and, when necessary, instructions are sent to fuel supply companies 5a, 5b and **maintenance** /management companies 6a, 6b to supply fuel (LPG or NP) or provide **maintenance** for generator units 1a, 1b. As a result, generator units 1a, 1b easily provide stable and efficient operations. Electricity accounting operations between electricity consumers 2a, 2b and electricity providers 6, involving the billing and payment for the amount of electricity supplied (amount of electricity used), are performed separately from the management operations of generator units 1a, 1b described above. Thus, management centre 3 is used by electricity provider 6 in an effective way to operate generator units 1a, 1b.

The present invention is not restricted to the embodiment described above. For example, generator units 1a, 1b can generate electricity using micro-generator turbines fueled by petroleum, solar power, wind power, geothermal power, or the like. In these cases, it is necessary to provide adequate consideration of how the power supply will be backed up if these natural energy sources are interrupted. In particular, there will be a need to back up the power supply over long intervals, so the power capacity (charge capacity) of backup power supply 17 must be sufficiently large.

Maintenance operations for generator units 1a, 1b do not have to all be handled by service companies. Simple operations that can be performed by electricity consumers 2a, 2b may be dealt with by sending **maintenance** information and instructions to electricity consumers 2a, 2b from management centre 3, e.g., via the Internet INT. Furthermore, **maintenance** operations for generator units 1a, 1b can be carried by the **maintenance** management companies 6a, 6b at fixed intervals, while irregularities, such as gas leaks, are dealt with when they occur. Other changes can be implemented as well as long as they do not depart from the spirit of the present invention.

With the present invention as described above, electricity is supplied in a stable manner from a **generator** unit□installed□for an electricity consumer, even if laying of electricity cables from a public power company is difficult. Furthermore, the operation status of the generator unit is monitored by a management centre. Based on this monitoring, instructions are sent to service companies to provide **maintenance** operations for the generator unit, e.g., supplying fuel and performing **maintenance** inspections. This allows the generator unit to be operated in an efficient manner. Furthermore, accounting operations for electricity supply service fees are performed between the electricity provider operating the generator unit and the electricity company. These accounting operations are performed separate from the operations/ **maintenance** tasks for the generator unit. Thus, the electricity provider can conduct business in a reliable manner.

Having described preferred embodiments of the invention with reference to the accompanying drawings, it is to be understood that the invention is not limited to those precise embodiments, and that various changes and modifications may be effected therein by one skilled in the art without departing from the scope or spirit of the invention as defined in the appended claims.

CLAIMS EP 1202594 A2

1. An electricity generation equipment management system characterised in that it comprises:

at least one generator unit, operated by an electricity provider, for supplying electricity to at least one electricity consumer;

a management system having means for monitoring an operation status of the said generator unit and for monitoring the amount of electricity supplied to the said electricity consumer thereby; and

a system for communicating information between said management system and the said electricity provider to enable the electricity provider to determine an electricity supply service fee in respect of electricity consumed by the said consumer based on information received from the said management centre.

2. An electricity generation equipment management system according to Claim 1, characterised in that the said at least one **generator** unit is **installed** locally with respect to the said at least one electricity consumer.

3. An electricity generation equipment management system according to Claim 1 or Claim 2, characterised in that there is provided at least one generator unit for each electricity consumer.

4. An electricity generation equipment management system according to any of Claims 1 to 3, characterised in that it further comprises:

a **service company maintaining** and managing operation of said at least one generator unit; and

said **service company** receiving instructions from said management centre.

5. An electricity generation equipment management system according to Claim 4 wherein:

said at least one generator unit is a fuel cell electricity generating device;

said **service company** includes a fuel supply company and a **maintenance** /management company;

said fuel supply company supplying fuel to said fuel cell electricity generating device; and

said **maintenance** /management company performing maintenance on said fuel cell electricity generating device and responding to irregularities in said fuel cell electricity generating device.

6. The electricity generation equipment management system as described in Claim 2 wherein said at least one generator unit is used locally by said at least one specific electricity consumer as a home generator system.

7. The electricity generation equipment management system as described in any preceding claim wherein:

said at least one **generator** unit is installed for said at least one specific electricity consumer in a region where laying or **maintaining** electrical cable from said electricity provider is difficult; and

said management centre uses wireless communication equipment to collect information from said at least one generator unit regarding operation status of said at least one generator unit and regarding an amount of electricity supplied to said at least one specific electricity consumer.

8. The electricity generation equipment management system as described in Claim 7 wherein said electricity provider uses the Internet for billing and payment of said electricity supply service fee for said at least one specific electricity consumer.

9. An electricity generation equipment management system comprising:

at least one locally installed fuel cell electricity generating device supplying electricity to at least one specific electricity consumer;

a management centre monitoring an operation status of said at least one fuel cell electricity generating device via a predetermined network; and

a **service company maintaining** and operating said fuel cell electricity generating device based on instructions received from said management centre;

a database for storing information about irregularities issued from said at least one fuel cell electricity generating device in association with information relating to said**service company**corresponding to said irregularity information; and

means for notifying said**service company**associated with said irregularity by looking up said database upon detection of an irregularity in said at least one fuel cell electricity generating device.

10. An electricity generation equipment management system according to Claim 9, wherein there is provided one of said at least one fuel cell electricity generating device for each one of said at least one specific electricity consumer.

11. An electricity management system, comprising:

generating means for generating electricity;

said generating means being local to a specific electricity consumer, whereby power cables from an electricity provider to said specific electricity consumer are unnecessary;

monitoring means for remotely monitoring said generating means; and

billing means for charging said specific electricity consumer for a consumed amount of said electricity.

12. An electricity management system according to Claim 11, further comprising a management centre for receiving data from said monitoring means.

13. The electricity management system as described in Claim 11 or Claim 12 further comprising:

a**service company maintaining**and managing operation of said generator unit; and

said**service company**receiving instructions from said management centre.

14. An electricity management system according to any of Claims 11 to 13 wherein:

said generating means includes a fuel cell electricity generating device;

said**service company**includes a fuel supply company and a **maintenance** /management company;

said fuel supply company supplying fuel to said fuel cell electricity generating device; and

said**maintenance** /management company performing maintenance on said fuel cell electricity generating device and responding to irregularities in said fuel cell electricity generating device.

15. An electricity management system according to any of Claims 12 to 14, wherein said management centre uses wireless communication equipment to collect information from said generating means regarding operation status of said generating means and regarding an amount of electricity supplied to said specific electricity consumer.

16. An electricity management system according to Claim 15 wherein said electricity provider uses the Internet for billing and payment of an electricity supply service fee for said specific electricity consumer.

17. A method of managing electricity generation equipment comprising the steps of monitoring at a management centre the operating status of at least one generation unit and the electricity supplied thereby to at least one consumer and communicating information concerning the operating status and electricity supply to an electricity provider whereby to enable the electricity provider to determine the fee charged for the supply.

18. A method according to Claim 17, further comprising the steps of monitoring at a management centre remote from the equipment the operating status of at least one generator unit, and transmitting information on the operating status of the generator unit to a

service companyto enable a requirement for□maintenance□
operations to be determined.

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DIALOG(R)File 15:ABI/Inform(R)

01524291 01-75279
Turn emergency generators into dollars
Sheahen, Thomas P; Stegen, Gilbert R
Power Engineering v101n10 PP: 24-29 Oct 1997 CODEN: POENAI ISSN: 0032-5961 JRNL CODE: PEG
DOC TYPE: Journal article LANGUAGE: English LENGTH: 4 Pages
SPECIAL FEATURE: Charts References
WORD COUNT: 2247

ABSTRACT: Many factories, office buildings and hospitals have standby generators, which are normally used only when there are power outages. The underlying economic strength of this proposed concept is in converting that idle equipment into increased capacity. This provides a greater safety margin for the utility and the factory or other facility. The value of this power becomes very high when the grid is at or near full capacity. During this period, any significant load perturbations could cause grid collapse. If the standby generator is connected seamlessly to the load, thereby reducing the apparent load, the grid demand will be reduced and a safe operating margin maintained. Controlling the entire system and dispatching selected generators requires sophisticated system engineering.
TEXT: THE CONCEPT OF DISTRIBUTED, DISPATCHABLE POWER generation is essentially the reverse of interruptible service.1 It can be understood by regarding both power and money as vectors: when the direction of the power flow switches, so does the direction of the money flow. At a signal given by the utility, a factory activates its emergency generating system and briefly becomes an independent power producer (IPP), feeding power into a local region of the grid. Upon receipt of another signal, it retires from that role. It may, however, continue to generate power for its own use.2

OPERATION

Many factories, office buildings and hospitals have standby generators, which are normally used only when there are power outages.3 Typically, they are sized smaller than the users full-load requirements. During an outage the user shuts down non-essential uses and connects the generator to the downsized load. When the grid can again supply full**power** , the standby **generator** is disconnected and the full load is reconnected to the grid.

Because the power seldom fails, these standby generators almost never go into action. Therefore, a significant amount of capital is tied up in idle equipment. The underlying economic strength of this proposed concept is in converting that idle equipment into increased capacity. This provides a greater safety margin for both the utility and the factory or other facility.

From the utility's point of view, during times of high power usage the grid may not be able to supply sufficient power to**maintain**the desired load. In this situation, power generated at a customer's site reduces the apparent load. The value of this power becomes very high when the grid is at or near full capacity. During this period, any significant load perturbations could cause grid collapse. If the standby generator is connected seamlessly to the load, thereby reducing the apparent load, the grid demand will be reduced and a safe operating margin maintained.

CONTROL

It is not trivial to interconnect a series of auxiliary generators in this way; controlling the entire system and dispatching selected generators requires sophisticated system engineering. The control and dispatch enterprise could be run by an intermediate energy-management service provider, or by an office within the utility itself. One such service provider is the team of Science Applications International Corp. (SAIC) and AuBeta Technology Corp., a company that has developed a proprietary dispatchable standby generation system controller. Absent this controller, it would be impossible to keep a collection of distributed generators under control.

There are three elements of control involved in a system of this type: First, the standby equipment must be synchronized with the existing grid when it comes on. This is in contrast to the customary operation of standby generators, which are connected break-before-make, and hence do not require grid synchronization. Figure 1 illustrates the concept. Accordingly, the dispatching system located at a remote site must be able to detect and control that synchronization prior to locking into the grid.

Second, the dispatching system must choose generators from one or more participating facilities to send electricity to where the need is greatest. This requires some sophisticated knowledge of the grid, including the typical loads being carried by various distribution buses. It is important that increasing capacity in one sector during a time of high demand does not overload or otherwise upset some neighboring sector.

Third, the standby generation equipment must work upon demand. To ensure this, the energy management service provider takes over complete responsibility for the**maintenance**of the equipment at each□location□ . Regular **maintenance** visits, coupled with continuous monitoring and testing from the**remote**dispatch center, combine to assure reliability of the equipment.

In practice, a system is set up as follows: The energy management service provider secures the rights to control generators. In exchange for those rights, the generator owners receive financial compensation, usually proportional to the size of the generator and the expected output. Next, the provider negotiates a contract with the local utility to provide peak power capacity in specific geographical regions. This is a very important element: the utility will buy peak power inserted at a certain location. The utility pays the energy manager for this specialized extra capacity in proportion to the total capacity.

The energy manager designs,**installs**and operates the special equipment needed to connect the **generators** to the grid, and the additional equipment needed to remotely control and monitor each**generator**and its **power** production.

Figure 2 shows how both the electrical and the money paths are linked in this system. The money reaching the generator owner amounts to a longterm lease on the possibility of using his equipment, through which the utility can meet its other needs.
ADVANTAGES

(Illustration Omitted)

Captioned as: FIGURE 1

(Illustration Omitted)

Captioned as: FIGURE 2

From the factory's point of view, this concept means "found money." The cost of the standby generator is sunk capital, long since justified by emergency considerations. A third party's offer of money just for the capacity-the right to turn on its generator-is an offer that's difficult to refuse. The factory further benefits from the reduced cost of**maintaining** its standby equipment. Moreover, at such time as the standby generator does turn on, the entire fuel cost is borne by others. And in a true outage or emergency, the standby equipment reverts to the factory's own control.

The power generated falls in the category of peak-shaving, but that is not sufficient motivation to interest a utility in participating. The availability of wholesale wheeling suggests that there will always be cheaper power available than**power**produced from standby□generators□in factories. But it is important to remember that the grid is subject to transmission/distribution (T/D) capacity limits. There are many urban regions where the utility cannot deliver additional power from external sources without overloading the system. Therefore, utilities would like to have peak power "home grown," i.e., both generated and used just a few miles apart. If that can be done, the utility avoids the cost of upgrading the T/D system, a modification both expensive and fraught with opposition in many urban settings. Therefore, the utility may find it economically advantageous to acquire additional capacity that is located within the highest-demand sectors of its grid.

COST CONSIDERATIONS

Determining the cost of added capacity is easier than determining the value of added capacity. At times when the grid is in danger of collapsing, the value is much higher than in times of general excess capacity. Conversely, if the grid has capacity but the system is short of power and additional power can be bought from other sources, then the value is higher but not high enough to motivate a system such as this.

There are additional factors that affect both cost and value of power. For example, guaranteed uninterruptible power carries a premium. In the case at hand, the value of additional capacity will depend on which part of the power delivery system is operating at or near full load. When the entire T/D system is operating well below full capacity, the incremental cost is only the cost of power production. When the distribution system is operating at or near capacity, the avoided incremental cost for the next amount of capacity may be very large.

In general, at every utility there will be some number representing the cost of additional generating capacity. For simplicity, assume $1,000/kW, but with the important proviso that the cost of T/D expansion can easily double this number. Tacking on further environmental costs, a new gas turbine facility might exceed $2,000/kW. By comparison, the necessary instrumentation and control of an alreadyinstalled diesel generator costs from $100 to $250/kW This constitutes a substantial incentive, and herein lies the opportunity for this dispatchable, distributed generation system to be economically viable.

Of course it is necessary to "annualize" the cost of new capacity. An investment of $2,000 corresponds to a foregone annuity of well over $100/yr, so the annual value of having an extra kW capacity likewise exceeds $100/yr. If the energy management**service company**charges the

utility only half that, it is a good deal for the utility.

Next, some payment must be made to the standby generator's owner. Here we hypothesize a yearly payment to the generator owner of $4.80/kW, plus having the standby generator maintained. Receiving $4.80/kW every year for just the right to turn on his emergency generator occasionally is a very good deal for the facility's owner.

At first it may seem extreme to pay the factory only one-tenth what the utility is charged. However, it must be remembered that the monitoring and control equipment has a substantial cost that the service provider needs to recover over a period of time. $125/kW is used as a mid-range number for the cost of instrumentation and controls on the standby generators. Some sample cash flow calculations, to illustrate the economics, are shown in Table 1.

In this scenario, the service provider's annual gross income is about one-third the cost of the monitoring equipment. This works out to a simple payback period of roughly three years, or an internal rate of return (IRR) of 27 percent. When **maintenance** costs are included (perhaps $2/kW annually), the effective payment to the generator owner rises to nearly $7/kW annually, the payback period to the service provider stretches out, and the IRR drops.

The point of these illustrative calculations is to show that the energy management service provider also experiences an attractive deal, without which the entire plan would never get off the ground. Obviously, the provider is motivated to reduce capital cost (the monitoring and control equipment) and thereby enhance profitability.

OBSTACLES

(Table Omitted)

Captioned as: TABLE 1

What could possibly go wrong?

The first thing that comes to mind is the conservatism of utilities. Nothing can be hung on their systems until it is proven to be trouble-free. Unless the utility has complete confidence in the energy management service provider, this concept will never be implemented. Very careful engineering tests must support each stage of this system.
A second significant obstacle is that this system is not needed everywhere. The great majority of peak-capacity needs can be met with power wheeled from far away. For many utilities, peaking capacity might be several GW, perhaps through a pumped-hydro facility. Clearly, a few MW in a system of this type is tiny. Furthermore, the cost of combustion turbines is dropping rapidly. Therefore, only in special geographical locations where the T/D system is strained (mostly dense urban regions) will utility managers consider the desirability of having the peak power generated within that local region of their service territory.

By far the most severe obstacles are institutional rather than technical. IPPs have already experienced great difficulty in obtaining air emissions permits. In general, standby generators have customarily been exempt from such permitting requirements. When this concept was first suggested in a metropolitan region of northern Virginia, the local regulatory board ruled that any unpermitted standby generators would have to be permitted. Immediately, this drove many potential participants away. In order to

retain an exemption from permit requirements, it would be necessary to convince the environmental-quality regulators with authority over an urban region that the only time these standby generators would go on would be in a genuine emergency, as the last measure just short of a blackout.

IMPLEMENTATION

To date, proof-of-concept and a number of engineering tests have been carried out by AuBeta Technology Corp. in cooperation with Puget Sound Energy in Washington State. Control software was tested and a small (5 kW) generator was successfully controlled and logged.

The next step was to test the controller system with a large (300 kW) **generator** . Cummins Northwest in Renton, Wash., has□installed□Onan parallel switching equipment designed to seamlessly connect the 300 kW **generator** to its internal load. This means the□generator□will be synchronized to the grid and then connected. Equipment is**installed**to guard against ground faults and other potential failure modes, such as unintentionally providing power to the grid. Typically, the**generator** will be powered up to carry the entire load from the grid before disconnecting. Power-quality monitoring equipment was**installed**to verify that the system was not perturbing either the load or the grid. This system is presently fully functional.

The next step is to instrument several generation facilities at different locations. The purpose of this is to have an ensemble of generators all working together. First, there will be a test of the signaling and control algorithms, without actually turning generators on. Next will come production of power kept entirely within the site (although with full synchronization), and only after that, electricity will be inserted into the grid. This step-by-step approach will increase confidence that the system will have no adverse effects on the grid.

Once this point is reached, questions of regulations and licensing will need to be settled. After success is demonstrated on a small scale, many factories may wish to participate. SAIC anticipates negotiating contracts with various generator owners and utilities to provide peak power. By that time, the need for locally generated power will presumably be even greater than it is now.

(Photograph Omitted)

Captioned as: Typical industrial generator that could be used as a distributed generation resource: 95 kW Waukesha generator at an oil field facility. Photo courtesy of Power Strategies.

Sidebar:

At a signal glven by the utility, a factory activates its emergency generating system and briefly becomes an IPP.

Sidebar:

The Utility pager for the energy manager for this specialized extra capacity.

GEOGRAPHIC NAMES: US

DESCRIPTORS: Generators; Power supply; Electric utilities; Energy management; Factories

CLASSIFICATION CODES: 9190 (CN=United States); 5150 (CN=Energy management);
8340 (CN=Electric, water & gas utilities); 8600 (CN=Manufacturing
industries not elsewhere classified)
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Mother Earth News
April, 2001

A WORLD OF RENEWABLE ENERGY.

SO YOU DON'T WANT TO PAY ANOTHER POWER BILL--EVER?

Solar-generated electrical power for the individual homeowner has been a MOTHER reader's dream since the first burst of national solar enthusiasm in the 1970s. For a brief period, it represented one of our best hopes for avoiding the oil-starved panic that ensued when the OPEC nations announced their embargo in 1973. Fueled by considerable government investment in 1977 with the passage of Carter's first budget, renewable energy technology was propelled into the nation's consciousness.

Several megawatt-size power plants sprang up in the sunlight-rich South and Southwest, where they continue to operate and provide competitively priced power. Individual homeowners did not fare as well, however. They were frustrated to find that generating electricity from the sun was neither cheap nor easy--especially in the North and Northwest, where the average number of sunlight hours is 30% less than in the South. Stand-alone solar electricity-generating equipment was still in its technological infancy; it was not terrifically efficient, and was unable to compete with the cost of the hooking up to the grid of the local utility. Building a remote home, then, meant spending a lot of money to extend a utility's electrical grid, or investing as much or more in a self-sufficient home-generated power system.

Through the 1980s, the industry progressed steadily. Despite reduced government funding for research and development, equipment became more efficient and less expensive. In the last 20 years, home systems have become so competitively priced, in fact, that it is now less expensive to design an independent generating station than it is to extend the utility service grid a half mile!

When electric utility deregulation was proposed in the late '90s, and approved in 30 states by 2000, it appeared, at first, to be a long-awaited opportunity for a variety of electricity suppliers to compete for customers. Such competition had the potential to substantially lower power bills. For a variety of reasons (see "News from MOTHER", page 6), just the opposite has happened. The newly open

market has sparked a rise in electricity prices so profound that it threatens to drive the national economy into deep recession. As the first and best alternative to this perpetual price victimhood, solar technology is in a unique position to finnaly get home. owners off the utility hook ... forever.

HOW THE SUN RUNS YOUR BLENDER

Large solar power plants use huge mirrors (called focused collectors) to concentrate the sun's heat on a central pipe. Water or another liquid flows through the pipe, where it is heated to become steam. The steam drives a turbine that generates electricity. Those living in areas serviced by these collector plants will enjoy a relatively stable and inexpensive source of energy for decades. For the rest of us, photovoltaic or PV cells are the most practical way to generate power. The WV effect isn't new, however. In 1839, a French scientist named Edmund Becquerel discovered that light falling on certain materials produced electricity, but it wasn't until 1954 that the first modern PV cell was built.

PV cells must be made from semiconductor material, and silicon is by far the most often used. When light strikes the cell, electrons are knocked loose from the silicon atoms and they flow into a built-in circuit, producing electricity. Simple. A cell about four inches in diameter will produce a little more than one watt of direct current (DC) power per hour of direct sunlight. Cells can then be joined together in groups and covered with a transparent material, such as tempered glass, to form modules, which can generate about 50 watts in bright sunlight Modules, in turn, can be joined to form arrays, which can be arranged to generate an unlimited amount of power.

In many small PV systems, the appliance is simply wire directly to the module, but for larger applications such as home use, a power regulator, battery and wiring system are necessary so that energy can be stored for evenings and cloudy days. A fly in the ointment is that solar modules generate DC power and most household appliances require alternating current (AC) power, so systems need a DC to AC power inverter. An inverter has to do more than just change DC to AC, however; it must also modify the electricity to meet the standards of utility power for which most home appliances are designed, In the U.S., utility-generated electricity changes polarity 120 times per second at 60 cycles (or hertz) and is delivered in a "sine" wave form. This means that when a power-hungry appliance, such as a dishwasher, is turned on, the power surge from the utility line is delivered smoothly and gradually, reducing the chance of damage to appliances by a sudden burst of power.

When inverters were first introduced in the early 1900s, they were actually electric motors with moving parts driving an AC alternator. They produced a smooth sine wave, but could only generate a modest mount of power at any given moment, usually no more than one kilowatt (kW). A washing machine or garbage disposal, for instance, can easily draw 2kW. Not only were the inverters incapable of providing enough AC power for even a small home, they were

hopelessly inefficient, demanding twice as much DC power as they ultimately delivered.

The following decades brought solid-state inverters, which were a bit more reliable and powerful, though still plagued by poor efficiency. Their wave form, square in pattern, was often accompanied by sudden surges of power. These surges were harmless to hardy appliances but could have potentially disastrus consequences for delicate equipment such as stereos and computers.

In 1985, Trace Engineering (now Xantrex Technologies) introduced its first high-efficiency, modified square-wave inverter, revolutionized the home-power industry. Losing no more than 10% of incoming DC power during inversion, it made the entire family of AC appliances available to the independently powered home. Additionally, the inverter's modified square wave suppressed most of the undesirable effects of the pure square wave. Finally, it could produce 2kW of peak AC current at a cost comparable to lower-powered models. Solid-state, computer controlled, pure sine-wave inverters came next, often reviling for less than $3,000 with an efficiency rating of greater than 90%. These all-in-one units typically include an inverter, battery charger and battery charge, and often a stop/start control for the gas generator. The unit can sense when batteries are depleted and then start the backup generator automatically. This translates into greater flexibility, ease of operation and reduced cost.

PRICE OF THE GRID

So, now the technology is ready and waiting, but is it practical? The answer depends entirely upon the site of a new home. After contacting local utility companies in several states including New York, Tennessee, and Idaho, MOTHER calculated that an average cost for grid extension is $6 per foot if the line is placed above-ground, and nearly $10 per foot if the cables need to be buried. All the companies we contacted provide a certain amount of extension at no charge, usually 300 to 500 feet. If the extension runs 800 feet utilities will charge only for the last few hundred feet. If you run new cable above ground to a home a quarter mile away from the grid in Cairo, New York, for instance, Niagara Mohawk (the utility that covers most of upper and western New York State) will ask for $5,520, or $9,200 if the line must be buried. Design a remote home just a few miles down a rural highway and the cost jumps into the six figure range. And then, of course, yon have a monthly utility bill to look forward to.

Until fairly recently, solar power offered little economic reason to change course. When the first stand-alone units were introduced in the mid-'70s, the systems cost $100 per watt-hour of energy produced. Even at $50 per watt-hour, a system that generated an average amount of home power ran up a $300,000 tab or more. Prices plummeted through the '80s however, and remote home kits currently sell for $3 to 8 per watt-hour. A fully outfitted PV system that supplies 4,000 to 5,000 watt-hours per day in northern climates will run you $15,000 to $20,000. Modules are designed, however, to

be joined together, so you can easily start with a small investment and add modules gradually. Once the grid extension of a half-mile or more is reached, the solar alternative will already have paid for itself the minute yon turn it on! Your home will continue to have power even when your neighbors on the grid experience a blackout (as hundreds of thousands of California customers have this year) and your electricity costs will remain stable throughout the life of the system.

SYSTEM DESIGN

How much power will your home need? You can calculate a reliable figure by counting the appliances in your home and tallying the total wattage over the course of an average day. If the television is on for four hours and consumes 65 watts, write 260 watt-hours in the daily column. After a few calculations, the importance of higher efficiency appliances such as compact fluorescent lighting becomes clear.

It isn't uncommon for an average household using grid power to consume 10,000 watt-hours of electricity per day, so how can home owners adapt to half as much? For starters, you need to reexamine your electrical needs. If the daily electrical load for your home is 3,000 watt-hours, your solar system must generate that power plus anywhere from 30% to 40% more. Why the extra wattage? Any electrical system loses some its power through wires and connections, and solar systems lose even more. Battery banks generally waste 15 to 25% of their power while discharging, wires and regulators lose 2% each, and inverters will lose 5% to 10%.

While you are planning, it's important to understand that there are some things average-size PV systems were never meant to accommodate. Electric water heaters and electric baseboard heaters, for instance, consume power in such volume that they cannot be properly supplied without a massive PV array (Amory Lovins once compared heating with electricity to cutting butter with a chainsaw). These appliances, along with cook stoves, clothes dryers and air conditioners--use 85% of a typical home's energy.

There are, however, refrigerators and freezers designed for solar homes that consume 20% of a conventional model's energy. They are more expensive, but save several times their cost in electrical savings over their usable lifetime. Propane heating used to be a cost-effective way of avoiding the natural gas grid, but propane prices have risen nearly 50% over the last year, and its cost-effectiveness has now been virtually eliminated. Our recommendation is to use passive solar collectors for preliminary water and air heating and then either a supplemental wood bunting outdoor furnace ... or propane as a last resort.

DANKOFF SOLAR PRODUCTS, INC.

Dankoff Solar Products pioneered low-cost solar water pumping starting in 1983. More than 10,000 Dankoff pumps have been installed worldwide and are especially favored by remote-site home owners, ranchers, state and nation forest and park authorities, and

overseas and services. Dankoff offers the world's largest variety of solar pumps, to meet a wide range of needs.

A Dankoff pump typically uses half as much electric power as competitors' models. It also uses DC power instead of conventional AC. This allows the pump to run directly from a solar power system in the simplest and least expensive way. A conventional pump will require a solar power system that is twice the size and cost, so a Dankoff pump can save you thousands of dollars.

Their pump systems (pump + power system) range in cost from $500 to $8,000, depending on lift, pressure and flow requirements. They are cheaper than windmills, and often cost little more than a generator system, with less maintenance and no fuel costs, noise or pollution. Dankoff pumps can work with every type of independent power system, including hydro, wind or solar (photovoltaic), or in combination with a generator or grid power.

XANTREX

Trace Engineering[TM] recently merged with several other companies to become Xantrex Technologies, Inc. Xantrex has a long history of pioneering, designing and manufacturing equipment which enables the use of renewable energy.

Inverters made it possible for "regular" homes to be powered by DC sources such as solar electricity, small wind turbines and microhydro systems. Xantrex was the first to produce a multipurpose inverter that could operate bidirectionally and sell excess renewable power to the utility grid as well as serve as a power security device when grid failures occur.

Sun Tie

The Trace[TM] brand Sun Tie, manufactured by Xantrex, is at the front of a new market emerging in North America which converts solar power directly into utility power without the use of batteries.

ST is a very simple-to-install machine; it is basically a plug-and-play system, and all necessary components (except the PV array) are included in a single UL listed product. A typical installation can usually be completed in less than a day.

The Sun Tie offers homeowners key benefits

* Reduced electricity bills monthly--Every kW produced by the PV is a kW not bought from the utility.

* Secure future electric pricing--PV systems have at least a 20-year design life. The price of power from the array and the Sun Tie will not vary over the entire design life of the product.

* Environmentally friendly power is easy to produce, and there is no mystery as to where it comes from. Many utilities offer "green

power" from far away. The homeowner now has the opportunity to see exactly where the power is coming from and to own the means of production.

* Many state governments are offering incentives to bring new sources of renewable energy online, owners of PV arrays and Sun Ties can use these incentives to lower the costs of their systems.

* Distributed generation--many small generating sites distributed across a grid--means that utility companies can avoid investing in new large-scale, environmentally harmful new power projects. This is good for the planet and the ratepayer. Large-scale utility investments will otherwise translate into even higher power prices.

* Distributed generation also allows ordinary Americans to be part of the solution rather than sitting on the sidelines. People taking committed individual action such as installing a PV array and Sun Tie along with energy saving devices such as Compact Fluorescent Lightbulb's programmable thermostats, and efficient electric motors can make a huge difference in today's energy crisis.

* Available in four sizes to fit your needs: 1.0, 1.5, 2.0, 2.5 KVA capacity.

A Home Utility

Solar panels often produce more electricity than your home can use, and the excess can be stored in batteries and for a time, storing excess power in batteries was the only choice. Now there is another option. In the last few years, 30 states in the U.S. have made it possible to do something else with excess power created by solar energy. In these areas, if you make more electricity than you use, the excess can be sent into the power lines (this is known as net metering). You can make a positive contribution to the environment and save on your power bills as well.

SUNELCO

Given the rising coats of electricity due to deregulation of the electric utility companies and intensive labor costs involved with bringing electric power to remote locations, solar electricity is moving into the new millennium as a preferred alternative to traditional generation methods. Sunelco has been designing, selling and installing alternative elect, dc systems for more than 15 years and are proud to be a part of an industry that will provide clean, low-coat and reliable electric power for millions of people worldwide in the future.

Many of their customers are remote home or homestead owners who have decided to opt for solar electricity rather than bring in costly overhead or buried power lines from the utility company (either of which will cost tens of thousands of dollars for even a half-mile extension!). Others are urban and suburban homeowners who prefer to make their own power rather than rely on power generated by coal, oil or nuclear-fired power plants. Still others want to reduce

their power bills while supplying a part of their home's power requirements from sunshine.

Sunelco publishes the Sunelco Planning Guide and Product Catalog which is geared toward the prospective alternative energy user. It leads the reader through the considerations necessary before attempting a project of this nature. It also provides a complete listing of the components required, tips on basic installation and prices, as well as helpful data and appendixes of great value to the person wishing to do it themselves.

In addition to providing written information, Sunelco's staff of engineers and technicians are available to discuss your needs, help you in sizing an appropriate system and offer assistance at the time of installation with wiring diagrams, answers to electrical code dilemmas as well as conservation guides to help you switch seamlessly from utility power to the brave and independent now world of renewables,

Part of their philosophy is that by taking care of each customer's individual needs they'll have happier customers, more referrals and fewer returns--and the environment will be better for having them around.

SIEMENS SOLAR ELECTRIC

A MILESTONE IN PHOTOVOLTAICS: SIEMENS SOLAR IS NUMBER ONE, WiTH 200 MEGAWATTS WORLDWIDE

Siemens Solar has shipped solar cells and solar modules with a cumulative peak power of 200 megawatts, making it the number-one solar manufacturing company in the world. Siemens Solar has been producing solar cells and solar modules for more than 20 years, reaching the 100-megawatt milestone in 1996 and has been able to double this figure in just four years.

The company's solar cells, which convert sunlight directly into electrical current, are used in a vast range of application areas and different sizes of installation around the world, from supplying power to garden lighting, through operation of water pumps for drinking water, right up to grid-connected photovoltaic power stations.

Examples of power stations are the Mont Soleil project in Switzerland and Kerman in California, each with an output of 500 kilowatts, and the one-megawatt installation at the New Munich Trade Fair Center. With a module surface area of around 7,800 square meters, this is the largest rooftop solar power plant in the world. The cumulative figure for solar cells and modules supplied to date by Siemens Solar is equivalent to 200 times the output of this reference installation. Approximately 200 megawatts would be sufficient to supply light, water and refrigerated vaccines to more than 10 million people in remote off-grid areas of developing countries.

Siemens Solar Industries L.P. also announced recently that they

have received approval of its earthsafe[TM] solar electric kits for homes from the Florida Solar Energy Center (FSEC). Included in the kits are Siemens Solar 25-year warranty modules, mounting kit, inverter and interconnects. Applications for earthsafe[TM] systems are homes, schools and commercial buildings. They convert sunlight into electricity, providing green power and reducing the peak demands on utilities while reducing the monthly power bill of the owner. The earthsafe[TM] systems are the first UL-listed systems to receive this approval.

Florida is the first state to require approval of PV systems by a state agency. Under the System Design Review and Approval requirements of the Florida Buildings Program, solar modules are evaluated by the FSEC to ensure that the quality, safety and code compliance for system designs have been met. The approval process helps ensure reliability and customer satisfaction with solar installations, and is required for utilities and other program partners before they can receive State of Florida buy-down funds for PV installations.

"Winning FSEC approval for earthsafe[TM] kits helps those in the building industry because it assures them of a preapproved PV system when going before inspectors and utilities," notes Arthur Rudin, Manager of Training and Technical Services. "This ultimately helps protect both the contractor and the customer."

BACKWOODS SOLAR ELECTRIC SYSTEMS

The Off-grid Remote Home

An independent natural power system typically produces just 10 to 25% of the electricity consumed by a utility powered American home. That is about 1 to 5 or at most 10 kilowatt hours of electricity on a sunny day.

Rather than major lifestyle changes, Backwoods Solar keeps most advantages electricity offers while consuming only a small percentage of the powers others use. Here's how:

1. Design whole house (water, heat, power) for low energy use.

2. Carefully select very special low-energy lights and appliances.

3. Eliminate energy waste by appliances or by human carelessness.

After meeting those three measures, a practical and affordable solar electric system (or wind, microhydro or a combination of the two) can provide electricity for your home.

Just five kilowatt hours per day runs both their Backwoods Solar business and their home.

What Will It Cost?

A rural solar electric home can be set up anywhere from $2,500 to $28,000. Most often it comes between $4,500 and $15,000 complete. The cost varies with amount of power needed, and also with the average daily sunshine hours for your location and climate. Windmill generators can be used together with solar to generate power in more varieties of weather. On a site with windspeed measured and confirmed, wind generation used along with solar will reduce the total cost of the power system.

Backwoods Solar can help you choose and estimate the cost of the right equipment if you let them know how many people are in the house, something of their lifestyles, the appliances, whether there is a home business activity, and anything else that would affect power usage. They pride themselves on giving you the best equipment, the most cost-efficient installation, and the best and most informative follow-up care in the business.

SOLARELECTRIC.COM

As energy prices are skyrocketing and global warming increases, people are looking for more ways to become energy self-sufficient. Through the use of "alternative energy" products such as photovoltaic (solar), wind and water, people can achieve this independence. Solarelectric.com, formerly Alternative Energy Engineering, has not only installed some of the largest commercial photovoltaic systems in the United States, but has been providing alternative power systems to individuals for mere than 20 years. A great number of their staff has been living off-grid for over twenty years, With this expertise, they can help you design or troubleshoot a PV, wind or hydro pumping or electrical system so that you can become energy self-sufficient. Free technical assistance, shopping online, a 124-page design catalog, toll-free ordering and huge on-hand inventory are a few of the reasons why Solarelectric.com is number one. Solarelectric.com is also an authorized Trace repair center.

Solarelectric.com carries a complete selection of:

* Inverters

* PV modules

* Fans

* Hydrogenerators

* Wind generators

* Water pumps

* Regulators

* Batteries

* Appliances

* Lights

* Gift items

INTERMOUNTAIN SOLAR TECHNOLOGIES

Intermountain Solar Technologies specializes in making independent power generation easy for anyone to use. Their qualified technical staff has assisted thousands of people with the design and installation of clean, quiet and reliable renewable energy systems. Their exclusive pre-engineered power systems include virtually everything you need for a successful installation. From small portable power systems for recreational or backup use to larger turnkey stand-alone power systems, they have the power solution for you.

They also offer free advanced technical support to any of their customers. Their goal is to assist customers not only with design and component selection, but they also want to assist with the successful installation and user education of their power systems.

As one of the few independently owned renewable energy distributors left, they recognize the importance of offering their customers more than just a pile of components. They want each and every application they assist in to offer years of reliable power. They are setting the standard in service for independent energy providers. That is why their product line features only the finest offered in the renewable energy industry. They have gone to great lengths to ensure that their customers have access to the best the world has to offer for clean energy solutions. Trace, Heart Interface, BP Solar, Solarex, Astro Power, Siemens, Southwest Windpower, Shurflo, Sunrise and Zomeworks are just a few of the leading manufacturers they represent.

Their Web site (www.intermountainwholesale.com) has schematics and component descriptions of several renewable power systems for home or business, starting with 500-watt minisystems and going all the way to their biggest do-it-yourself 30,000-watt power system. The largest, turnkey, stand-alone systems will handle all of your home or business electrical needs, including 120 or 240 VAC well pumps and heavy-draw appliances. The two 5,500-watt included inverters are stacked to provide 11kw of continuous power. Add wind options to a system and on days with winds at 25 mph, the AIR 403 turbine is capable of producing more than 7,000 watts on its own!

They have also recently completed their new Solar Resource Guide to help educate you about the many applications for renewable energy products. This new book is being provided as a tool to help you in selecting the highest quality components for your specific application.

Intermountain Solar Technologies recognizes that without the proper support many people who purchase these technical products will be

left scratching their heads. They take great pride in the level of service their customers have grown to expect.

Their system design team has been published in several nationally recognized homesteading publications with feature articles about various successful renewable energy applications.

If you're working on a battery maintenance system for an RV or a large communication repeater site, they have the technical expertise to help you.

If you are just considering a renewable energy system for future use, give them a call and they'll be glad to discuss the viability and cost effectiveness of dozens of different power applications.

SIERRA SOLAR SYSTEMS

With 21 years in the solar energy field, Sierra Solar Systems offers unlimited expertise and experience in the sale and design of solar systems. They are an independently owned and operated company that specializes in photovoltaic system design, and they design complete systems as well as sell a variety of individual products. In their large, detailed catalog--available to you at no cost and published twice a year--as well as in their extensive Online Catalog (at www.sierrasolar.com), you will find an impressive selection of products available for purchase, including photovoltaics, wind power, hydropower, batteries, inverters, DC pumps, energy efficient lighting, solar hot water, propane refrigerators, generators, composting toilets, room heaters and books.

Sierra Solar Systems also provides you with a helpful, knowledgeable staff to assist you in the sale or design of your solar system. Their staff has extensive experience with both on- and off-grid systems, and most of their employees live in PV-powered homes. They offer a toll-free installation hotline, and local installation is available to you by a licensed electrical contractor. They have a full-time engineer and a technician who are always on duty to answer your technical questions.

Sierra Solar Systems is among the leaders in number of net metering connections. They can help you to sell your power back to your company. They have facilitated more than $50,000 worth of California State rebates to their customers. And you are not alone in choosing Sierra Solar Systems to provide you with solar energy: though most of their customers are homeowners, they have also worked with the U.S. Forest Service, California Department of Transportation, Alabama Department of Transportation, Disney World, numerous universities, and many small businesses, ranches, and farms.

If you are looking to bring solar energy into your home or business, Sierra Solar systems can provide you with the products, experience and support you need.

	Type	L #	Hits	Search Text	DBs	Time Stamp	Comments	Error Definition	Errors
1	BRS	L1	278	(generator$1 with install$3) and (("hard to get" or remote or difficult) with (location or place$1))	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 17:16			0
2	BRS	L2	2530	705/1,412,400,34,35,36,37,39,40.ccls.	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 17:39			0
3	BRS	L3	10415	705/$7.ccls.	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 16:14			0
4	BRS	L4	1	1 and 2	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 16:15			0
5	BRS	L5	2147130	(service adj company) or maintain$4	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 16:16			0
6	BRS	L6	166	1 and 5	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 16:17			0
7	BRS	L7	2	(wireless and internet) and 6	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 16:20			0
8	BRS	L8	165	6 not 4 or 7	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 16:19			0
9	BRS	L9	133092	(electricity or power or electrical) with generator	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 16:20			0
10	BRS	L10	107	8 and 9	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 16:20			0
11	BRS	L11	7	wireless and 10	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 16:56			0
12	BRS	L12	6	5754033.URPN.	USPAT	2003/07/23 17:32			0
13	BRS	L13	15	("4322630" | "4428349" | "4477765" | "4496286" | "4508077" | "4629968" | "4659977" | "4668872" | "4731547" | "5092302" | "5168208" | "5294879" | "5315229" | "5325043" | "5361216").PN.	USPAT	2003/07/23 16:34			0
14	BRS	L14	2	5973481.URPN.	USPAT	2003/07/23 16:39			0
15	BRS	L15	10	4 or 7 or 11	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 16:56			0
16	BRS	L16	100	10 not 15	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 16:56			0
17	BRS	L17	159813	(central adj station) and utility (bill$3 or payment or paying)	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 16:58			0
18	BRS	L18	10	16 and 17	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 17:15			0
19	BRS	L20	20	15 or 18	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 17:15			0

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21	BRS	L22	0	3 and 21	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 17:15			0
22	BRS	L23	0	(generator$1 with install$3) and 5 and 9 and utility and 2 and wireless	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 17:17			0
23	BRS	L24	9	(generator$1 with install$3) and 5 and 9 and utility and wireless	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 17:33			0
24	BRS	L25	5	24 not 20	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 17:18			0
25	BRS	L26	1	6396839.pn.	USPAT	2003/07/23 17:33			0
26	BRS	L27	25	24 or 20	USPAT	2003/07/23 17:33			0
27	BRS	L28	286	(generator$1 with install$3) and 5 and utility	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 17:34			0
28	BRS	L29	272	28 not 27	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 17:34			0
29	BRS	L30	0	29 and 2	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 17:36			0
30	BRS	L31	2	29 and 3	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 17:36			0
31	BRS	L32	154	705/412.ccls.	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 17:39			0
32	BRS	L33	0	5 and 32 and generator?1	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 17:39			0
33	BRS	L34	36	5 and 32 and generator$1	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 17:39			0
34	BRS	L35	7	34 and wireless	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 17:40			0
35	BRS	L36	35	34 not 27	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 17:40			0
36	BRS	L37	7	36 and wireless	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 17:47			0
37	BRS	L38	28	36 not 37	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 17:47			0
38	BRS	L39	15	9 and 38	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/07/23 17:47			0